AMERICA'S LARGEST TEXTILE MONTHLY

COTTON

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Number Two
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DECEMBER, 1922

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W. B. C. Smith Publishing Co.
Dalton, and Atlanta, Ga.

The Leaders in Their Field--
National Direct Blacks

The "National" manufactures a dozen types in the Direct Black class, chief among which are the following:

National Erie Black GXOO

the most largely used of all, giving a jet black of greenish shade. In common with other types in this group it is soluble, level dyeing, generally fast, particularly when after treated, and is suitable for dyeing cotton, wool, unions, hosiery, silk, leather and paper.

NATIONAL U.S.A. DYES

National Erie Black B Extra

yields a bright and bloomy shade not so jet as National Erie Black GXOO nor so red as National Erie Black RXOO

Among those giving reddish shades are:

National Erie black RXOO

and

National Erie Black NR Extra

possessing fastness to acid, which is also better suited for dyeing full shades on the jig; for dyeings in the fulling mill, for speck dyeing and for filling the cotton in union dyeings.

"National" Service

The "National's" aim is not merely the sale of dyes but the certainty of satisfactory results in their use. To this end we maintain a staff of practical dye-house experts and completely equipped laboratories at each branch office, whose services are always at the disposal of the user of dyes.

National Aniline and Chemical Company, Inc.

40 Rector Street **New York, N. Y.**

NATIONAL DYES

Table of Contents, page 35. Buyers' Guide, page 284. Advertisers' Index, page 296.

How The Blank Hosiery Company Gives Service Plus

WHAT lives today may die tomorrow. This is as true of merchandise as of human existence, and particularly where milady's personal attire is concerned.

Realizing this the Blank Hosiery Company is careful not to make up large quantities of any one color of hosiery for stock, but at the same time it leaves no stone unturned to get a new color on the market in the shortest possible time.

The Franklin Process Company is one of the most important factors in enabling this company to give its jobbers "service plus," especially with relation to fine single yarns, either worsted or cotton.

"Franklin Process Company?" inquires the agent over the telephone. "Take 1,000 lbs. of 60/1 cotton yarn from our stock and dye it into 4 shades, equal parts—Green, No. 109, Blue No. 105, Red No. 300 and Black No. 150; also 1,000 lbs. of 40/1 worsted yarn in same colors as the cotton. Ship to us on cones."

The Blank Hosiery Company keeps a supply of undyed yarn on our floor and orders it out in small quantities in the colors that the market is demanding at the time. In this way it eliminates the lost time which would occur, if the yarn had to be shipped from the spinner to us.

But the biggest advantage is that we deliver the yarn on knitting cones which saves the Blank Company still more time, also the cost of back-winding.

In other words, because the Blank Hosiery Company has its yarn dyed the Franklin way, it is able to put a new color on the market in a remarkably short time after it becomes the "rage on Broadway." And in this case, as in many others, quick action means big profits.

Knitting mills are only one of the many branches in the textile industry to which Franklin Process Company is rendering dyeing service. Other products dyed by this company include fine single worsted yarns that can not be dyed by any other process, hard twisted cords for tire fabrics, fire hose and cable cords, Merino yarns, worsted yarns on jackspools, glazed yarns and soft yarns for electric wire covering, cotton yarns for shirtings, voiles and dress goods, etc.

Write us what your dyeing problem is and we will tell you frankly if the Franklin Process will solve it.

FRANKLIN PROCESS CO.

Philadelphia PROVIDENCE Manchester, Eng.

New York Office, 72 Leonard Street

SOUTHERN FRANKLIN PROCESS CO.

Greenville, S. C.

MIRROR DROP WIRES

TRADE-MARK REG. U. S. PAT. OFF.

Having greatly improved the finish of our Northrop Loom Drop Wires we have adopted the trade-mark

MIRROR

to identify the drop wires of our manufacture and each shipment will contain a slip bearing this trade-mark

Although our prices for drop wires are higher than others that may be purchased, the superior finish of our drop wires makes them worth much more than the difference in price

IT DOES NOT PAY to polish the eyes of drop wires with the warp yarns, after reaching the loom

It takes too long and warps are too expensive

DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

ATLANTA GEORGIA

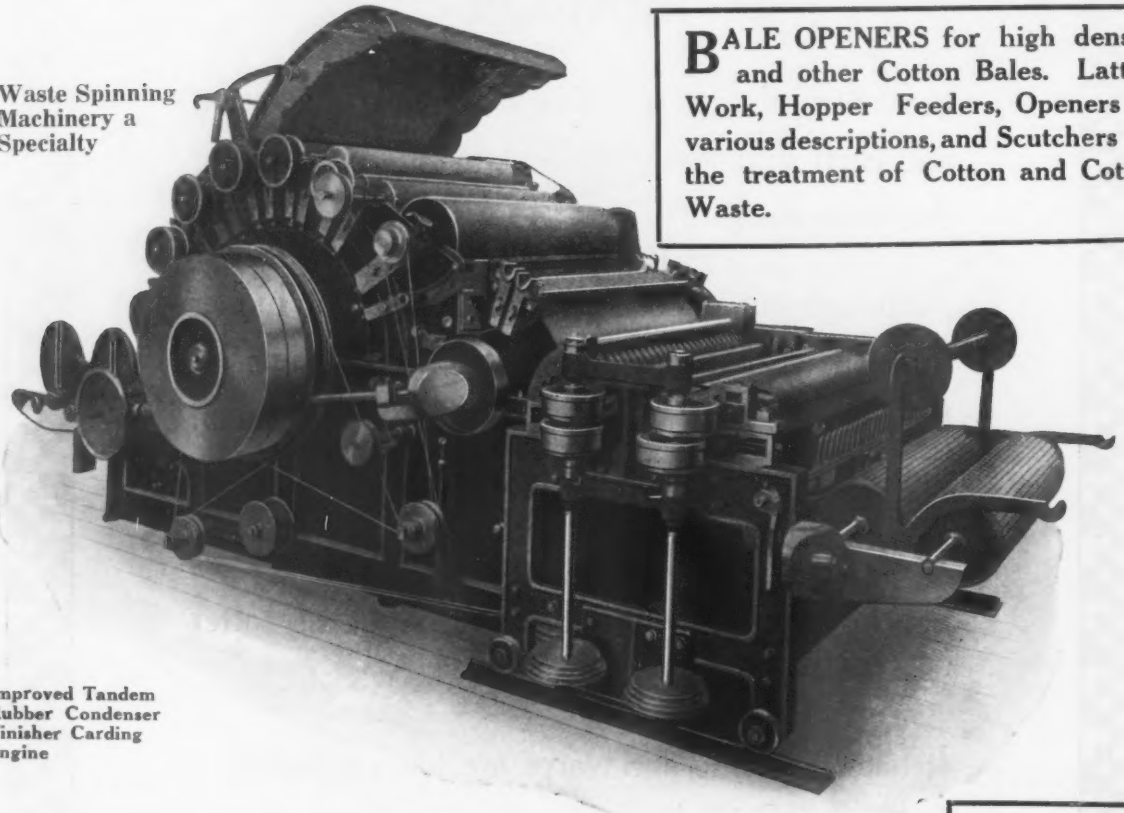
Copyright 1917 by Draper Corporation

LORD BROTHERS

TEXTILE MACHINERY MAKERS

Waste Spinning Machinery a Specialty

BALE OPENERS for high density and other Cotton Bales. Lattice Work, Hopper Feeders, Openers of various descriptions, and Scutchers for the treatment of Cotton and Cotton Waste.



Improved Tandem Rubber Condenser Finisher Carding Engine

IN EVERY country in the world where Cotton is manufactured Lord's Machinery has had a reputation for Efficient Service during the last 80 years. The sound construction and high-grade workmanship which has built up this reputation are at your disposal today.

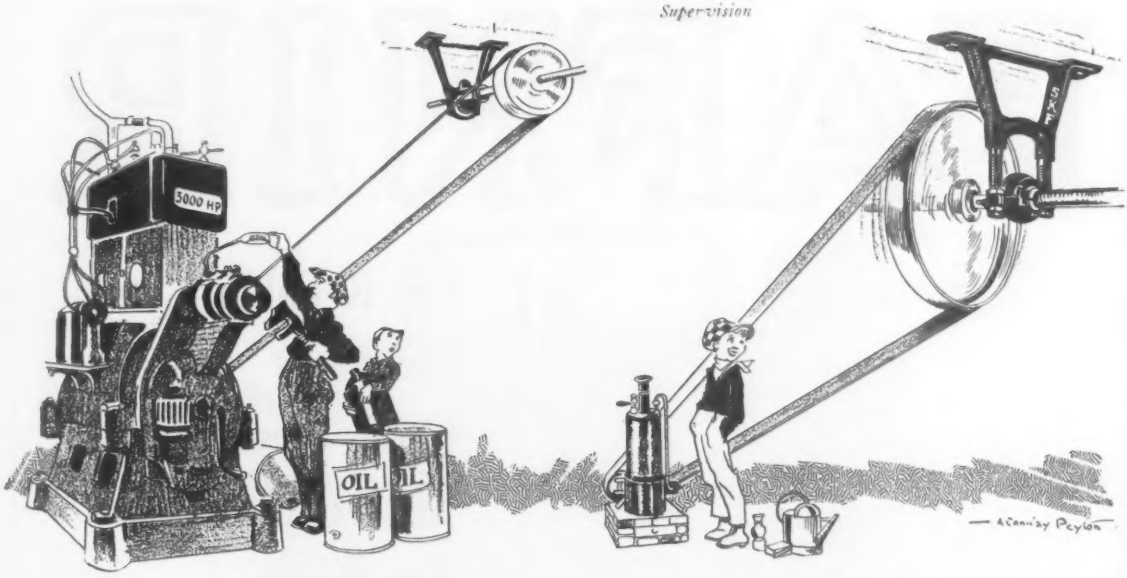
Write for descriptive leaflet of the above, or any other of our productions in which you are interested.

Cables: "LORD'S" Todmorden, Eng. Codes: A.B.C.: 5th: Bentley's: Lieber's, and A-1.

CANAL STREET WORKS, TODMORDEN, ENG.

INCORPORATED IN BROOKS & DOXEY (1920) LTD.

Made Under
SKF
Supervision



You Can Use Additional Machinery

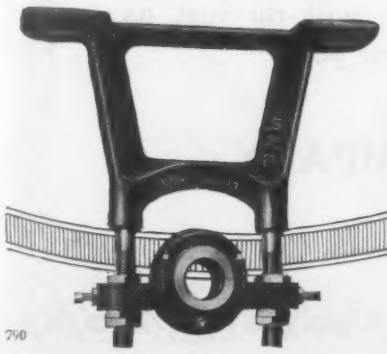
Without Increasing the Power Equipment

WHEN Skayef improved, self-aligning ball bearing hangers are used on line shafting, from 60 to 80 per cent. of the power consumed by plain bearings is released for useful work.

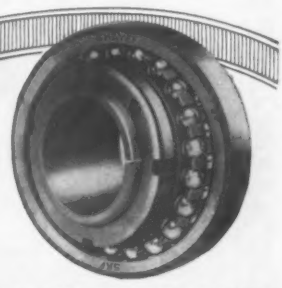
This is of vital importance to the manufacturer whose motors, engines and boilers are overloaded. He can use this released power for driving additional machinery which otherwise could not be installed without the expense of additional power-generating equipment.

Even if your power equipment is not overloaded it is a good investment to change over to Skayef equipment, for self-aligning ball bearings by saving more than half of the power which plain bearings waste, soon pay for themselves by reducing the power bill and effecting material savings in lubrication and maintenance.

Furthermore, self-aligning ball bearings never run hot and bind for even shaft deflections cannot affect their free running qualities. No adjustments are needed and oil is necessary only once every three or four months. Maintenance and lubrication costs are thereby reduced 80 per cent. Visit our show room and have these facts demonstrated to your satisfaction.



SKAYEF
Self-Aligning
Ball Bearing
HANGERS
(IMPROVED TYPE)



THE SKAYEF BALL BEARING COMPANY
165 Broadway New York City

790

FAFNIR

"LIFETIME" WARE
ALUMINUM COOKING UTENSILS AND ALUMINUM SPECIALTIES

ALUMINUM PRODUCTS COMPANY
OF THE PACIFIC COAST
OAKLAND, CALIFORNIA

FACTORIES
LA GRANDE, OREGON
OAKLAND, CAL.
ROLLING MILL
S. LA GRANDE

June 2 1922

The F. Somers Peterson Co.,
53-57 California St.,
San Francisco, California.

Gentlemen:-

We wish to thank you for inducing us to install the Fafnir ball-bearing on our Sturtevant Blower.

Owing to the high speed we were obliged to run the fan, our regular babbitt bearing would get hot and go to pieces very often. It was necessary to keep oil running thru bearings continually in order to run at all.

We cannot speak too highly of the Fafnir bearing and want you to know the worry it has taken from our minds. We have not had a partical of trouble since installing the Fafnir bearing.

Very truly yours

ALUMINUM PRODUCTS COMPANY
of the Pacific Coast
G. H. Bradley Supt.

FNB:KM

"Lifetime"

For Reliability and Efficiency Install Fafnir Double Ball Bearing Blower and Fan Boxes

Fafnir Double Ball Bearing Blower and Fan Boxes will pay for themselves many times over in power, oil and labor saved, and above all, in **reliability.**

These boxes involve unit construction and fit all standard types of blowers and fans.

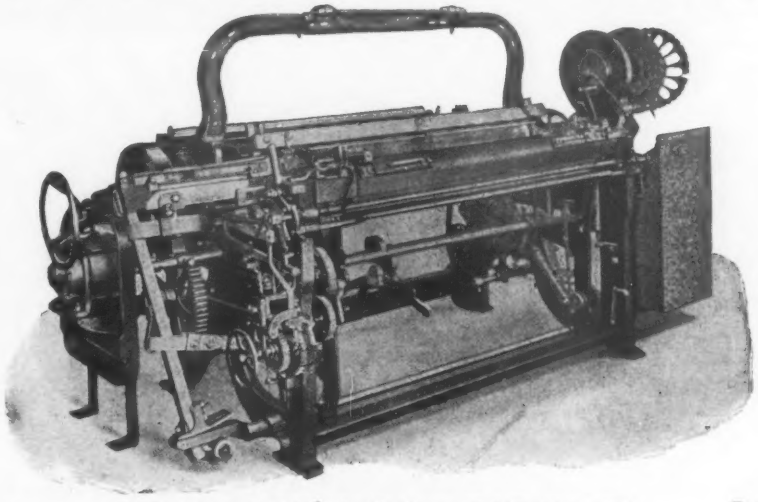
Read what **Fafnir Blower and Fan Boxes** have done for the Aluminum Products Co. —They will do just as much for you.

The Red Dragon Line

THE FAFNIR BEARING COMPANY

Conrad Patent Licensee
New Britain, Conn.
Southern Representative, O. R. S. Pool, Box No. 1375, Greenville, S. C.

STAFFORD
AUTOMATIC LOOMS



Stafford automatic bobbin-changing loom with high take-up roll.

There's A Good Reason!

Why do mill men—careful buyers, who have learned true value through wide experience—stick to STAFFORD when specifying more looms.

There's a good reason—varied experiences and comparisons always prove the Stafford basic design the highest efficency standard in year-in-and-year-out-service, producing more and higher quality fabrics at less trouble and expense for upkeep.

The first Stafford was not offered until it was perfected after long experimentation and careful tests. There has never been a better loom built, the best proof of which will be found in the thousands of the original Staffords that are today giving the same high efficiency service and production as they did when new.

The latest Staffords contain the same Stafford basic principle that the years have proven best,—the same careful design, substantial weight, thorough workmanship—typical Stafford efficiency from breast beam to whip roll, combined with new features which guarantee even higher quality of fabric and lower upkeep costs. These latest Staffords can be secured in either of two automatic types—shuttle change or bobbin change, or if desired in non-automatic types to which automatic motions may be added later without rebuilding the loom.

Once a Stafford user—always a Stafford user. There's a good reason—honest efficiency—permanently.

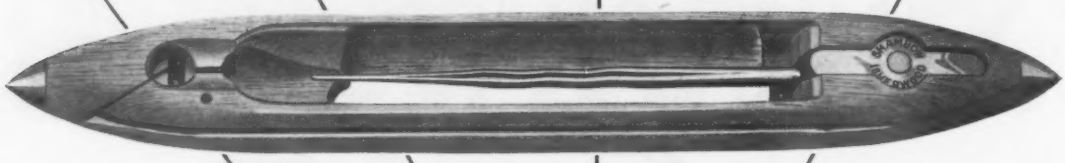
THE STAFFORD COMPANY

Weaving Machinery

READVILLE, MASS.

Branch Office—Paterson, N. J.
Southern Agent—J. H. MAYES, Charlotte, N. C.
Canadian Representatives—
WHITEHEAD EMMANS LTD., Montreal, Quebec

MEN MONEY MATERIAL MACHINERY



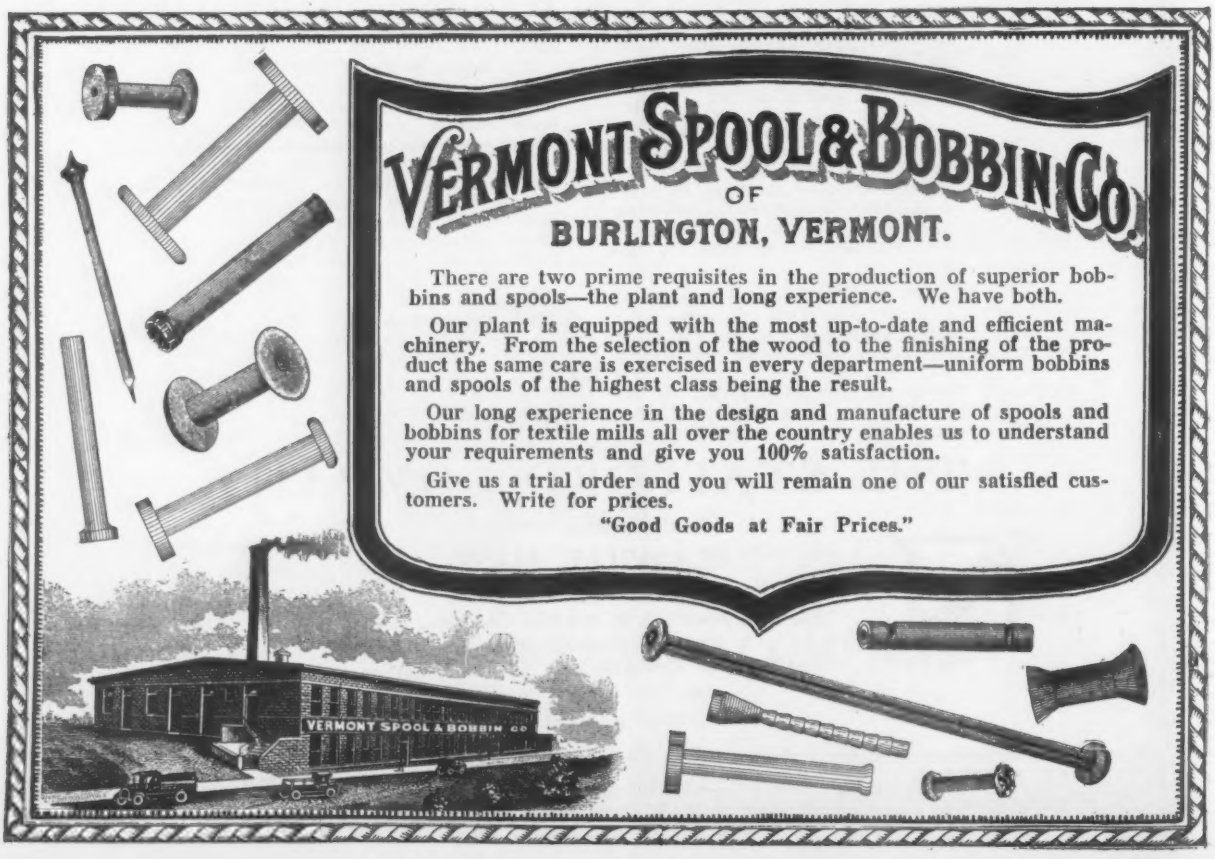
PROMPT DELIVERY

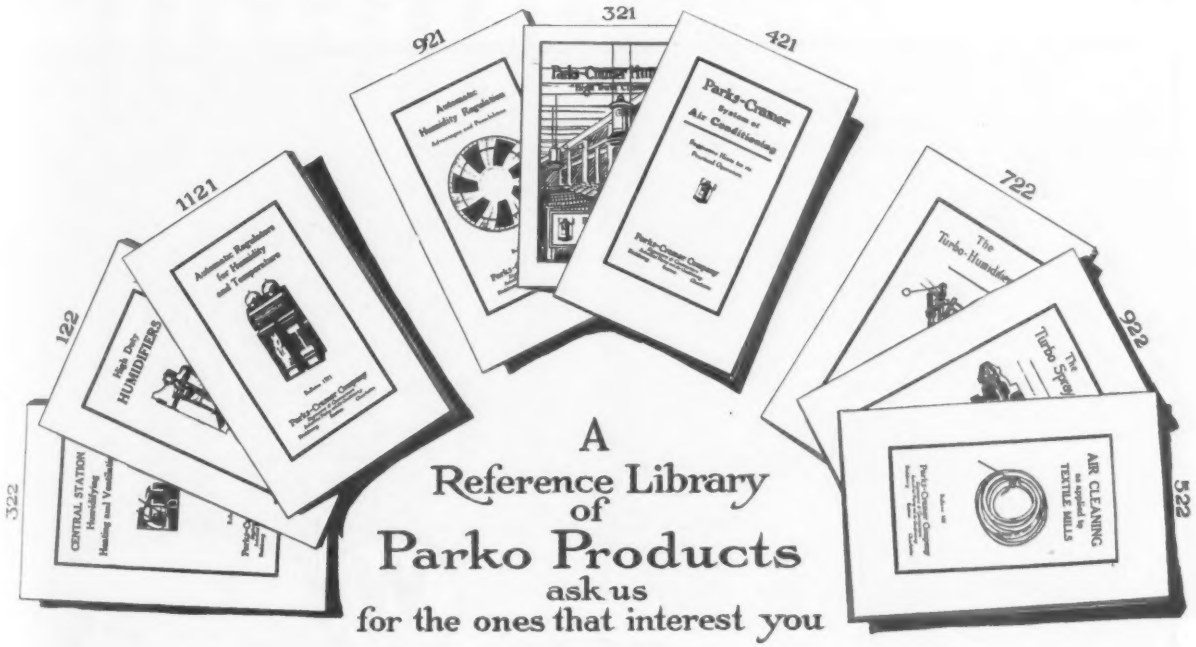
"HEART of the LOOM"

SHAMBOW SHUTTLE COMPANY

Woonsocket, R. I. Greenville, S. C. U. S. A.

JOHN C. SHAMBOW. Pres. & Treas. H. H. ULLMAN, V. Pres. & Gen. Mgr.


VERMONT SPOOL & BOBBIN CO.
OF
BURLINGTON, VERMONT.
There are two prime requisites in the production of superior bobbins and spools—the plant and long experience. We have both.
Our plant is equipped with the most up-to-date and efficient machinery. From the selection of the wood to the finishing of the product the same care is exercised in every department—uniform bobbins and spools of the highest class being the result.
Our long experience in the design and manufacture of spools and bobbins for textile mills all over the country enables us to understand your requirements and give you 100% satisfaction.
Give us a trial order and you will remain one of our satisfied customers. Write for prices.
"Good Goods at Fair Prices."
VERMONT SPOOL & BOBBIN CO



A
Reference Library
of
Parko Products
ask us
for the ones that interest you

No. 322—*Air Conditioning by Central Station*—Heating, Ventilating, Cooling and Humidifying from central source.
Yarn conditioning apparatus.

No. 122—*The High Duty Humidifier*—The first one, its characteristics and advantages.

No. 1121—*ParkSpray Humidity Regulator*—How it works and what it does.

No. 921—*What Automatic Humidity Regulation* means to the modern textile mill.

No. 321—*The place of Humidity in the Textile Industry* with the factors which govern its use.

No. 421—*Suggestions to the manufacturer* or his operatives, giving helpful hints for the practical operation of humidifiers in each factory operation. A classification of experiences extending over many years.

No. 722—*The Turbo Humidifier*—its particular uses and adaptability to existing conditions.

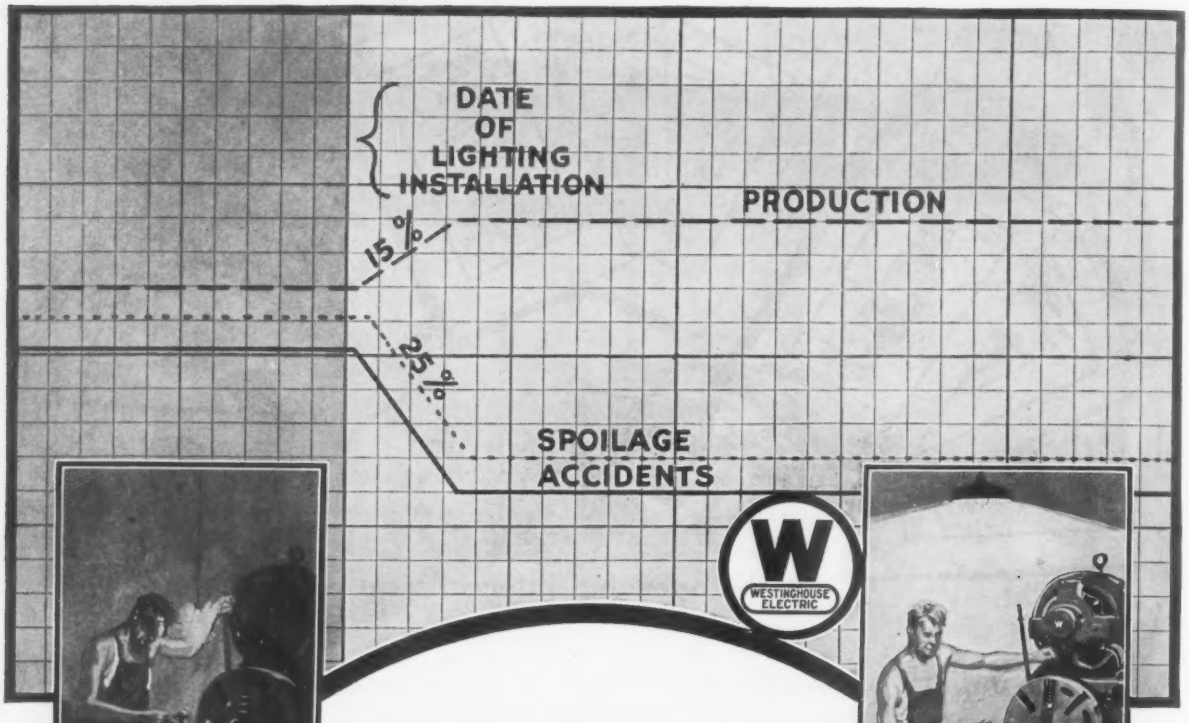
No. 922—*The Turbo Sprayer* for injecting moisture or oil into fibrous materials.

No. 522—*Air cleaning* as applied to textile mills.

Profit by High Duty Climate

Parks-Cramer Company
Engineers & Contractors
Industrial Piping and Air Conditioning
Fitchburg Boston Charlotte

Better Lighting DOES PAY



Hundreds of Manufacturers, Everywhere, Have Proved It

There is no story in the whole range of electrical development that is more clean-cut, or more easily verified, than the story of what good lighting brings to a factory. The facts are so easily understood, so impressive, and it is so easy to benefit from them, that every manufacturer can find possibilities of profit in them for his own business.

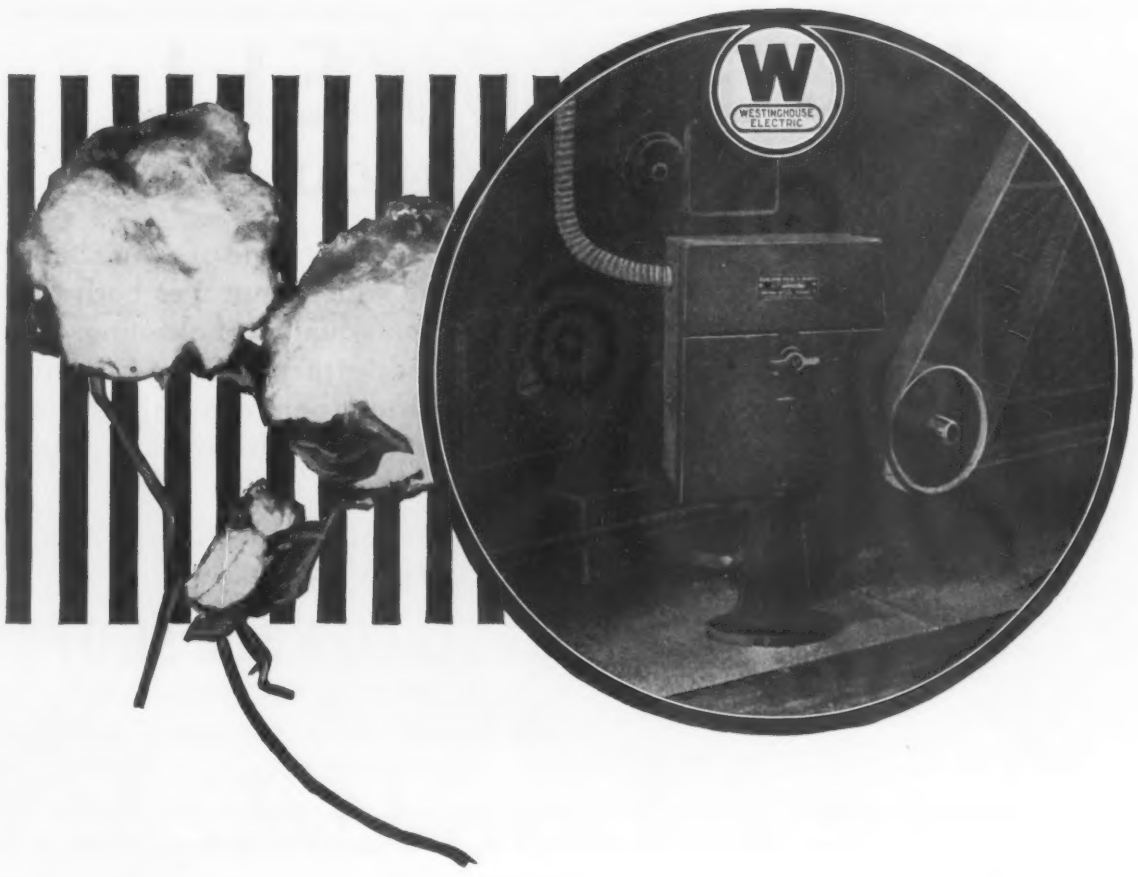
It is impossible in an advertisement, to touch upon all the benefits that follow the installation of scientific lighting. All that we can do here is to call attention to the three most important results that modern lighting methods have produced. The figures used are averages from literally hundreds of installations, and are, therefore, not only conservative, but reliable.

Manufacturers have invested in money and effort many times the amounts necessary to assure the rate of *production increase* that better lighting will give. *They* have spent, and are spending, thousands annually to *reduce spoilage* and *minimize rejects*. Every plant in this country should be, and is, vitally and financially interested in the *reduction* of *accidents*. *Scientific methods of lighting offer real gains to every manufacturer under each of these three headings.*

For the sake of your workers, and for the good of your business, get into touch with the nearest Westinghouse office, where the Illumination Bureau will gladly give you the established facts, as well as an accurate estimate of what better lighting would do for your own plant.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
Offices in all Principal Cities. *Representatives Everywhere*

Westinghouse



After a period of one year,

the General Manager said:

"The money invested to prevent accidents has paid better dividends than any similar outlay we have ever made for production."

That's where Westinghouse Safety Motor Starters shine. Simply constructed, small, serviceable and low-priced—they save and keep on saving.

A Safety Motor Starter for every a-c. motor from the smallest to 15 hp. capacity—Types WK-10, WK-20, WK-30 and WK-100.

Worth writing for —an illustrated booklet entitled "Full Safety Motor Starters," No. F-4500.

Westinghouse Electric & Manufacturing Company

Mansfield Works Mansfield, Ohio

Westinghouse

SACO-LOWELL

VERTICAL OPENERS

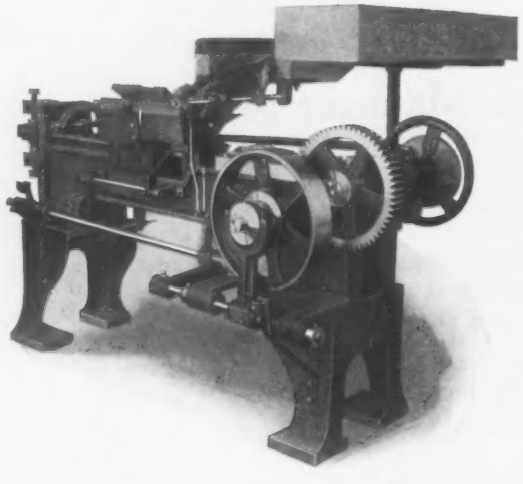
(Patent Applied For)

Showing the new style of Adjustable Grid Bars which improves both the quantity and quality of cleaning. A positive adjustment of the opening between these bars can be made so they can be adjusted to suit any grade of cotton used.

These bars are standard equipment on our new Vertical Openers.

SACO-LOWELL SHOPS

EXECUTIVE OFFICES, BOSTON, MASS.
ROGERS W. DAVIS, SOUTHERN AGENT,
CHARLOTTE, N. C.
SOUTHERN BRANCH OFFICE, GREENVILLE, S. C.



A NEW

BOBBIN STRIPPER

RUGGED AND EFFICIENT

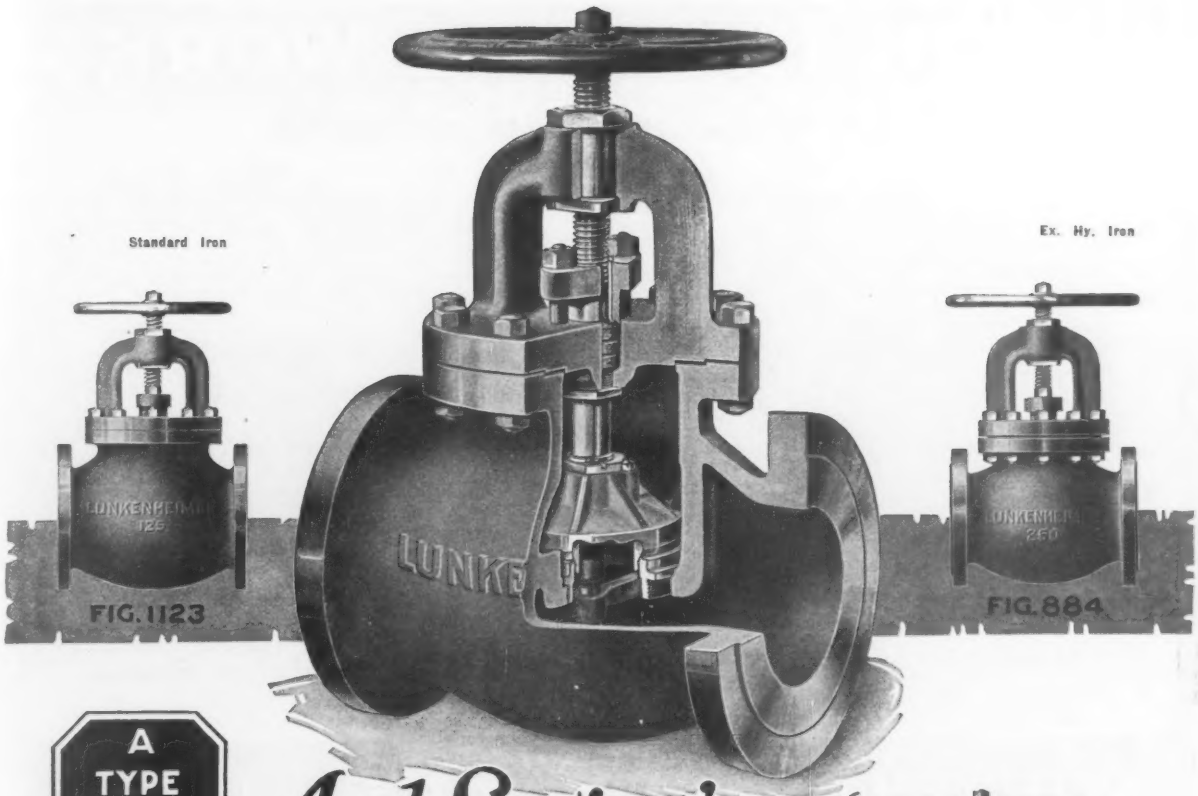
Submit Your Stripping Problem to Us.

Particulars and Pictures Sent on Request.

CROMPTON & KNOWLES LOOM WORKS

WORCESTER, MASS.

PROVIDENCE, R.I. PHILADELPHIA, PA. PATERSON, N. J.



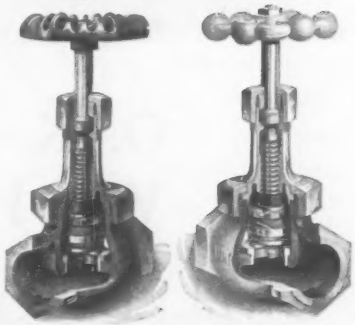
A TYPE FOR EVERY PURPOSE

And Service 'way beyond the average!

Be it a small or large size for low or high pressures and temperatures, there is a Lunkenheimer Valve especially suited to the purpose. Every type is designed to give maximum service under extreme operating conditions, and with the line complete, standardization throughout the plant, with its many advantages, is easily accomplished.

With seating surfaces regrindable and all parts made to gauge and renewable, the installation of Lunkenheimer Valves means permanence in the line with a minimum expense for maintenance and repairs.

Our catalog No. 58-AK illustrates and describes the various types in detail. A copy will be sent on request. If you have a valve problem, we will help you,—no obligation.



"America's Best since 1862"

THE LUNKENHEIMER CO.
"QUALITY"
LARGEST MANUFACTURERS OF HIGH GRADE ENGINEERING SPECIALTIES IN THE WORLD
NEW YORK CHICAGO CINCINNATI, U.S.A. BOSTON LONDON
EXPORT DEPT. 129-135 LAFAYETTE ST., NEW YORK

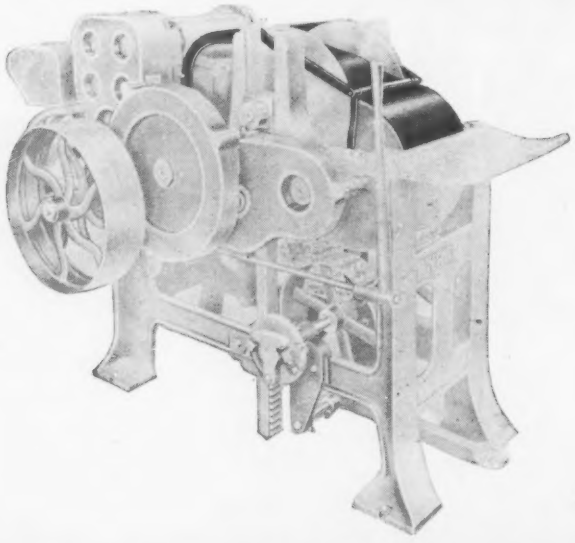
1300-20A-10

LUNKENHEIMER

WHITIN MACHINE WORKS

ESTABLISHED 1831

TEXTILE MACHINERY



"SAFETY FIRST"

Liability of Accident
is Eliminated
by the use of the
Whitin Patented Guard
applied to
Sliver Lap Machines

Descriptive Circular on Request.

MAIN OFFICE AND WORKS

WHITINSVILLE, MASS., U.S.A.

SOUTHERN OFFICE CHARLOTTE N.C.

The J. H. WILLIAMS CO.

O. K. Automatic Shuttles
Wire Heddles, Heddle Frames

MILLBURY, MASS.

Geo. F. Bahan, Southern Representative.

Building a Greater West

OLD prairie trails that once echoed the trotting of stage coach horses are now lively streets pungent with gasoline. The trail blazers have passed to Unknown Lands, leaving to their sons the ability to turn *opportunity* into *results.*

The Greater West was only a vision when the rich resources of mine, farm, ranch and fruit lands were first tapped. Even now that it is real, the future looks more golden than ever. And newcomers quickly become as keen Western optimists as the native born!

It is a pleasure for The National Shawmut Bank to help keep the West in close touch with the manufacturers of goods that have made New England world-famous. Machinery, tools, rubber, footwear, textiles, paper—these are products of highly specialized skill. The volume of these goods shipped to the West is proof that Western requirements are fully met.

There are many routine banking and also more personal services which this bank can perform particularly well for Western banks and businesses, because of our broad acquaintance with all New England activities.

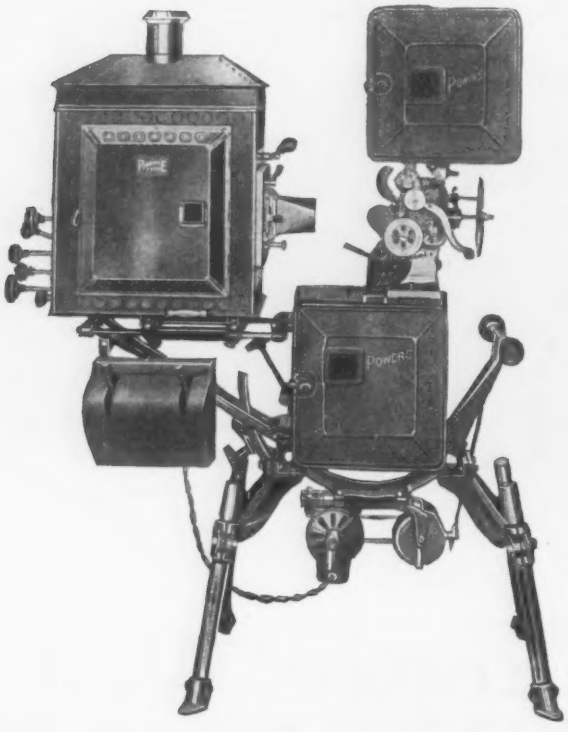
Correspondence is invited

Capital and Surplus $20,000,000

THE NATIONAL SHAWMUT BANK *of* BOSTON

40 Water Street, Opposite the Post Office

Let Us Add Your Name To This List



OUR service to textile mills is the result of years of experience in installing textile theatre equipment. Our representatives call upon the mills personally, lay out the plans, advise on the proper equipment required and finally supervise the installation and the starting of the theatre. In other words, they take the whole problem off your hands and do not turn over the work to you until the theatre is operating satisfactorily.

The textile industry is demanding the best moving pictures for their employees and that is why they regularly specify POWER'S PROJECTORS.

That is why more Power's Projectors are used by textile mills in the South than all other projectors combined.

We carry a complete line of supply parts and equipment at our various branches. Your orders for supply parts will be filled the same day the order is received. Whatever are your needs for your theatre, we can supply them.

We have a special offer for Textile Mills. May we present it to you?

Satisfied Users of POWER'S PROJECTORS

ALABAMA

W. A. Handley Mfg. Co.	Roanoke
Tallassee Mills	Tallassee
Fairfax Mill	Fairfax
Avon Mills	Sylacauga
Lanett Cotton Mills	Lanett
Indian Head Mills	Cordova
Selma Mfg. Co.	Selma
Buck Creek Cotton Mills	Siluria

GEORGIA

Elm City Cotton Mills	LaGrange
Bibb Mfg. Co.	Porterdale
Roswell Mfg. Co.	Roswell
Gainesville Cotton Mill	Gainesville
Bibb Mfg. Co.	Columbus
Pacolet Mfg. Co.	New Holland
Manchester Cotton Mills	Manchester
Milstead Mfg. Co.	Milstead
Thomaston Cotton Mills	Thomaston
Exposition Cotton Mill	Atlanta
Habersham Mill	Habersham
Trion Company	Trion
Union Point Mfg. Co.	Union Point
Hillside Cotton Mill	LaGrange

NORTH CAROLINA

Durham Hosiery Mills	Durham
Pamona Mills	Greensboro
Cleveland Mill & Power Co.	Lawndale
Rodman-Heath Cotton Mills	Waxhaw
Rocky Mount Mills	Rocky Mount
Cherokee Falls Mfg. Co.	Cherokee Falls
Roxboro Cotton Mills	Roxboro
Consolidated Textile Corp.	Burlington
Carolina Cotton & Woolen Mills	Spray
Erwin Cotton Mills	Duke
Cannon Manufacturing Co.	Kannapolis

SOUTH CAROLINA

Baldwin Cotton Mills	Chester
Tucapau Mills	Tucapau
Ware Shoals Mfg. Co.	Ware Shoals
Glenn-Lowry Mfg. Co.	Whitmire
Monaghan Mills	Greenville
Drayton Mills	Spartanburg
Victor Mills	Greer
Conestee Mills	Conestee
Kershaw Cotton Mills	Kershaw
Abbeville Cotton Mills	Abbeville
Chesnee Mills	Chesnee
Union-Buffalo Mills	Buffalo
Victor-Monaghan Mills	Seneca
Victor-Monaghan Mills	Jonesville
Pacolet Mfg. Co.	Pacolet
Aragon Mills	Rockhill
Graniteville Mfg. Co.	Vancluse
Woodside Cotton Mills	Greenville
Orr Cotton Mills	Anderson
Issaqueena Mills	Central
Clifton Mfg. Co.	Clifton
D. E. Converse Co.	Glendale
Winnsboro Mills	Winnsboro
Monarch Mills	Lockhart
Republic Cotton Mills	Great Falls

Southern Theatre Equipment Company

WILLIAM OLDKNOW, President.

No. Nine Nassau St.
ATLANTA, GEORGIA

THREE TWENTY-EIGHT CALIFORNIA ST.,
OKLAHOMA CITY, OKLA.

Eighteen Fifteen Main St.
DALLAS, TEXAS

Fleet of three White heavy duty trucks in the service of Cooper & Griffin, Inc., Greenville, S. C.

White Trucks

White Trucks will never be orphans. They are backed by:—

the maker's 21 years of steady growth;
predominant widespread ownership;
the largest output in the high grade field;
nation-wide investment in service facilities.

THE WHITE COMPANY
Cleveland

21 YEARS OF KNOWING HOW

Residence for Mr. J. Gunby Jordan, Columbus, Ga.

A COMPLETE SERVICE

Whether the problem be industrial buildings, water power or steam power projects, machinery arrangements, village developments or architectural plans, our service means that you secure a complete service under one control and one responsibility.

Engineering, architectural and power experts, each specializing in his particular field, assure our clients the most economical solution of any problem entrusted to us.

Our service has meant real money-savings to our many clients, not only in the initial investment, but in permanent satisfaction and dividend paying economy.

May we solve your problems for you?

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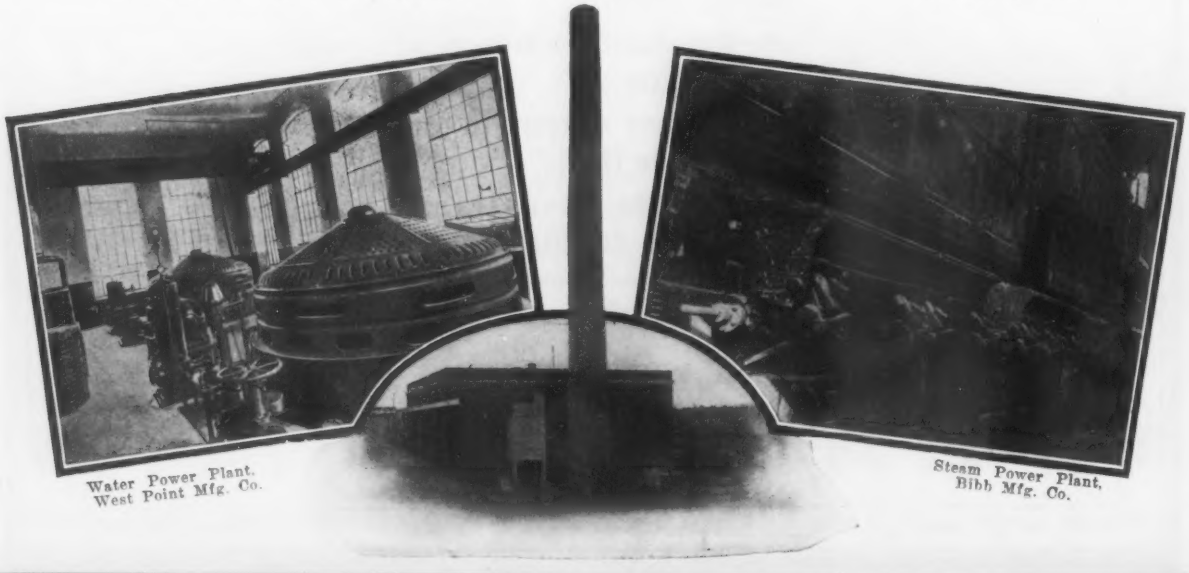
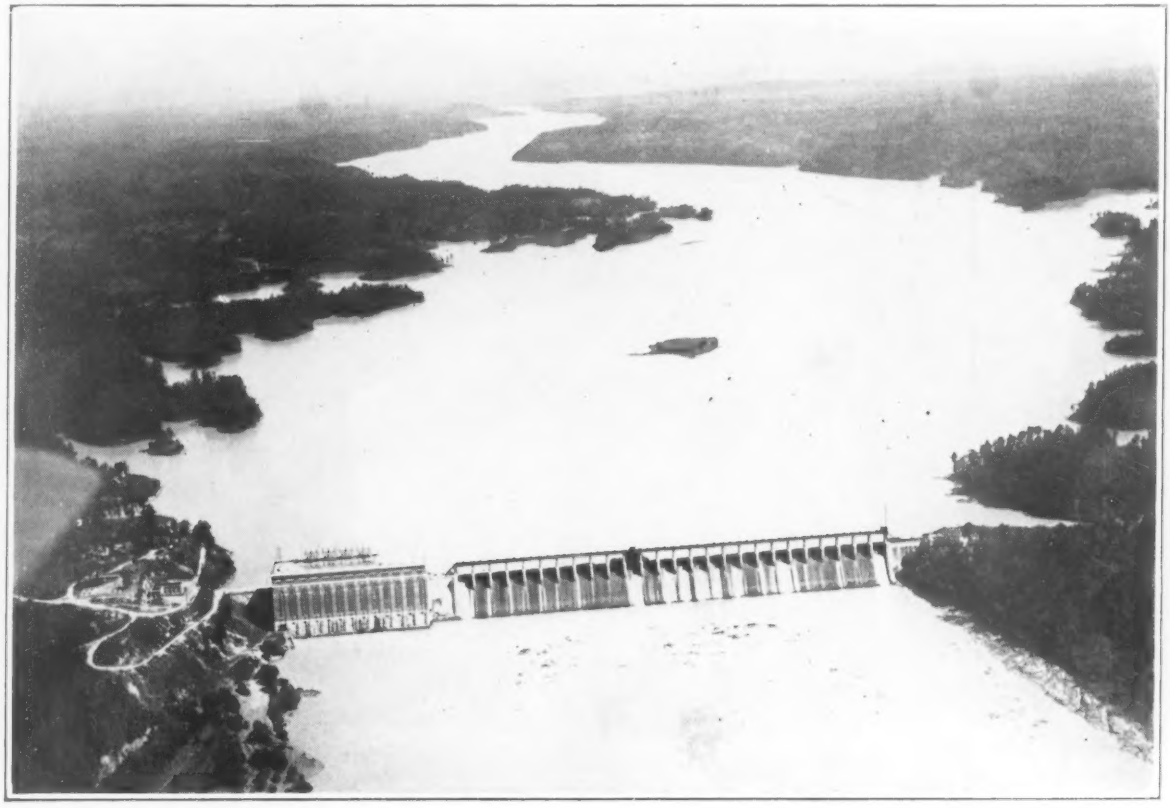
ARCHITECTS AND ENGINEERS ATLANTA, GA.



Water Power Plant, West Point Mfg. Co.

Steam Power Plant, Bibb Mfg. Co.

WILLING WORKERS



An Airplane View of Lock 12 and its reservoir on the Coosa River—110,000 Horsepower

FAMOUS trade marked and advertised cotton fabrics are carded, spun and woven in Alabama cotton mills, from cotton grown in Alabama, and could be dyed and finished here if finishing facilities were now available.

In Alabama the operatives are capable of competing with the operatives of any section of the country; and most important of all, they want to work, and will work on a basis of a working schedule of sixty hours a week. An ample supply of competent labor is available at fair rates.

Alabama offers a climate that is agreeable the year around. Laws are fair and invite manufacturing enterprises.

A large hydro-electric system provides *dependable primary power* in ample capacities for the largest industries. This power is available over an area of 25,000 square miles of the State, including the Piedmont section.

COME TO THIS STATE AND PROSPER

ALABAMA POWER CO.

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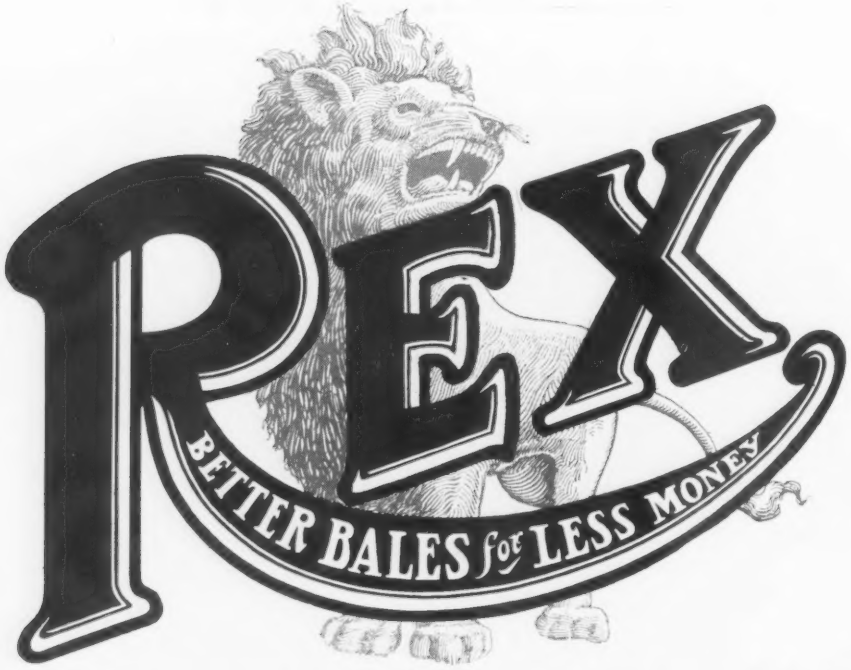
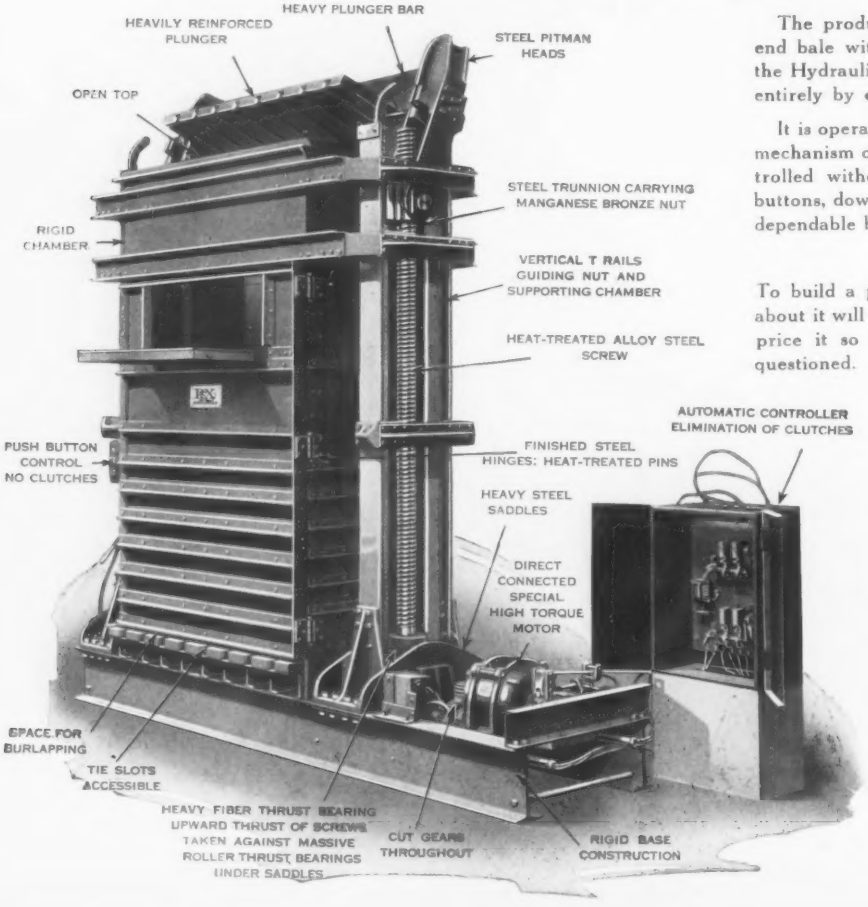


Engineers and Practical Mill Men at the Greenville Exposition Acclaim "REX" the King of Balers


HEAVY PLUNGER BAR
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STEEL PITMAN HEADS
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STEEL TRUNNION CARRYING MANGANESE BRONZE NUT
RIGID CHAMBER
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It is operated by a powerful double screw type mechanism of unique design and electrically controlled without clutches by three simple push buttons, down—up—stop. The fastest and most dependable baler on the market.

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To build a press so good that the simple truth about it will be adequate recommendation and to price it so fairly that its value can never be questioned.

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Southern Representative:
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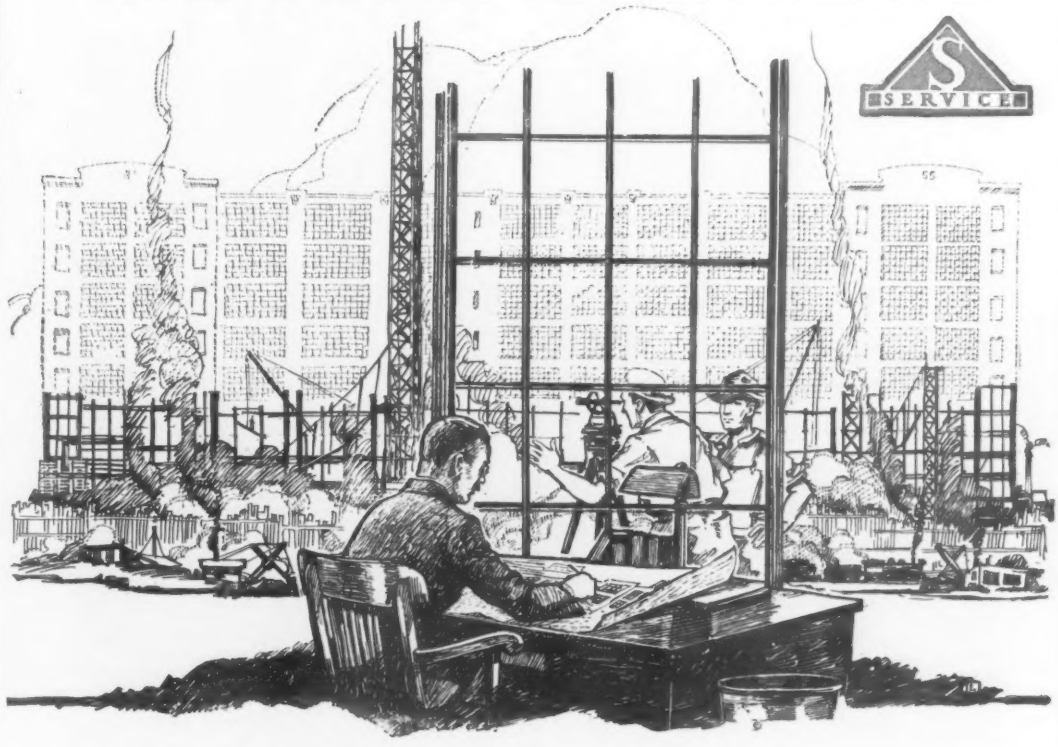
THE FUNCTIONS OF THE ENGINEER



THE ENGINEER QUICKENS THE PULSE OF INDUSTRY

THE Engineer brings vision to the manufacturer who wants to build a new factory or an extension.

From that vision arise the Engineer's plans, in which are embodied, with painstaking applications, every feature that will contribute to economical operation and production.

The Engineer works for his client from the inception of his vision to the completion of the structure. His is a profession of service. He buys nothing to resell at a profit. He plans, designs and supervises, but he does not act as a contractor. He studies and analyzes what should be done and how. Then he directs the doing, but he does not trade or speculate in the materials of construction.

He counsels his client and acts for him, guarding his every interest that Industry may benefit through better methods, uniform and higher quality, steadier profit.

In every way he ministers to Industry.

Among several interesting books on the Functions of the Engineer are,—"Picks to the minute," (textile); "Factories for the future; "Rivers in Harness," (Hydro-Electric); "Contentment Under Roof," (industrial housing). Any or all of these will be sent promptly on request.

J. E. SIRRINE & COMPANY

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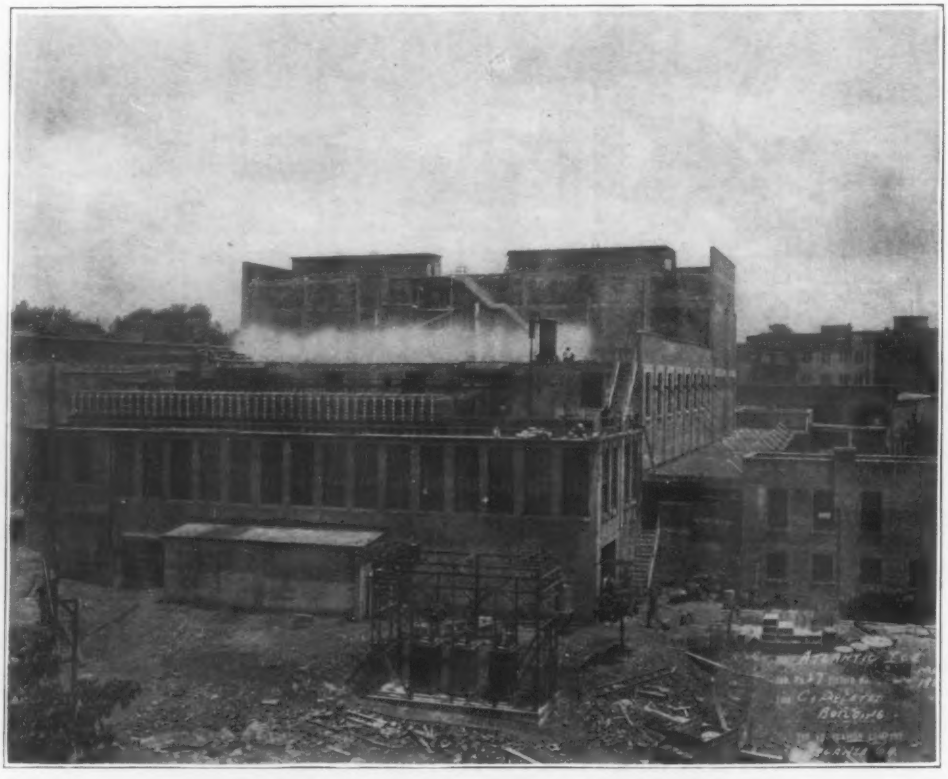
Greenville **South Carolina**



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BUILDERS OF **SUPERSTRUCTURES** AS WELL AS **SUBSTRUCTURES**

Pioneer with the Pioneer

—and be the first to reach the goal

THE textile industry, as a whole, has been among the first to emerge from the passing era of business depression. Trade conditions, together with efficient engineering and management, have all contributed to this condition.

Now, new problems of management must be solved. New operating conditions must be met. New standards of production must be established to meet new methods of merchandising.

And under these new conditions Lockwood-Greene experience and Lockwood-Greene service assume a new importance.

Lockwood, Greene & Co. have been meeting "new" conditions for nearly ninety years. They are meeting new conditions to-day.

Questions of finance, questions of management, questions of production, business problems, building problems, engineering problems—all are being met, solved and answered.

Lockwood-Greene service is a flexible thing ready to be applied to many calls, differing widely in their requirements. In meeting and solving the problems of to-day—and to-morrow, the experience and service of Lockwood, Greene & Co. are at *your* call.

Take advantage of them. Pioneer with the pioneer —and be the first to reach the goal.

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Showing Manomet Mill, No. 4, New Bedford, Massachusetts

"Where Quality Counts"

AT the Manomet Mills, a portion of which is pictured above, quality always counts in the manufacture of Cord Tire Fabrics and Combed Cotton Yarns.

Operated by able, willing workers, 318,480 busy spindles daily turn out products of high merit in this great textile plant.

Walls and ceilings of the Manomet Mills are painted throughout with OJACO Mill White. The result is a cheery background that gives an ample, even distribution of soft *reflected* light; more and better production; reduced lighting costs.

Further details of OJACO Mill White for textile mill interiors will be supplied upon request by the nearest OJACO distributor listed opposite.

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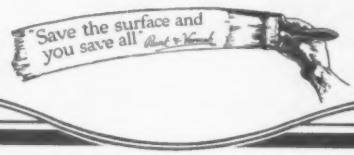

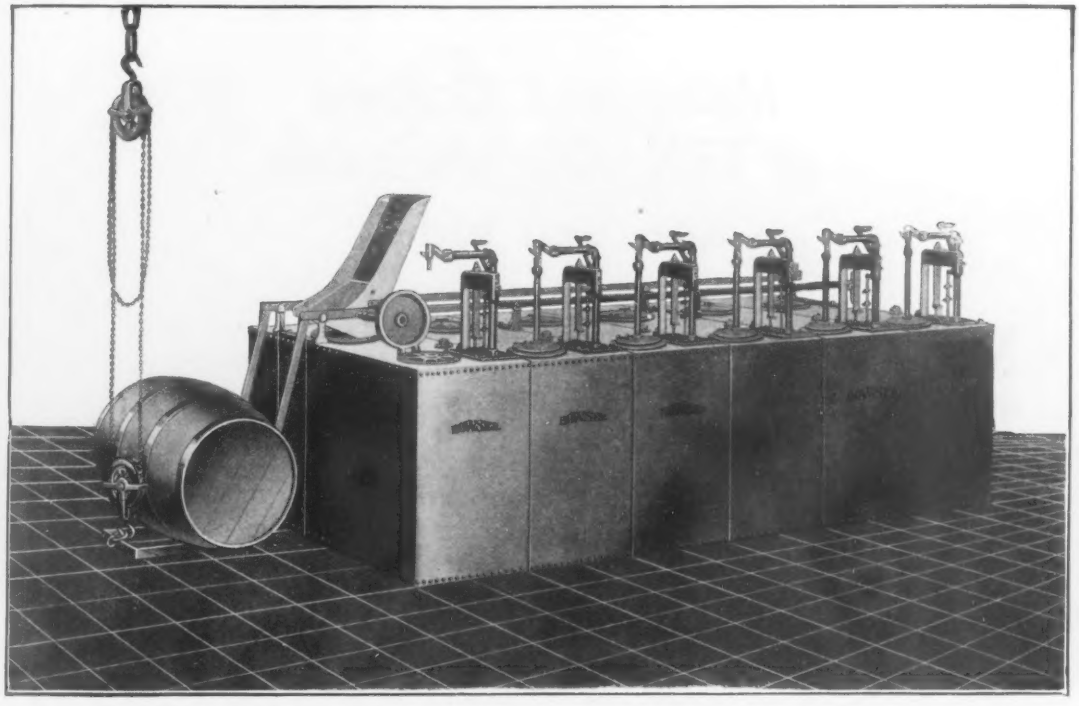

Says Jim to Bill—
"The Pay Envelope's Regular"

"Ever since the boss woke up, and put in our Bowser oil system, we've sure been a changed place, Bill, and it isn't just in appearance, either! We're turning out more work and better. But, what means the most to you and me is that we don't have those old part-time shifts any more—we work full time and *the pay's regular.*"

Oil is the big factor in keeping production up in quantity and down in cost. A Bowser system saves men's time, saves waste in the oil itself, secures minimum insurance rates—and better than all else, assures better plant operation, for it makes the oil convenient to use.

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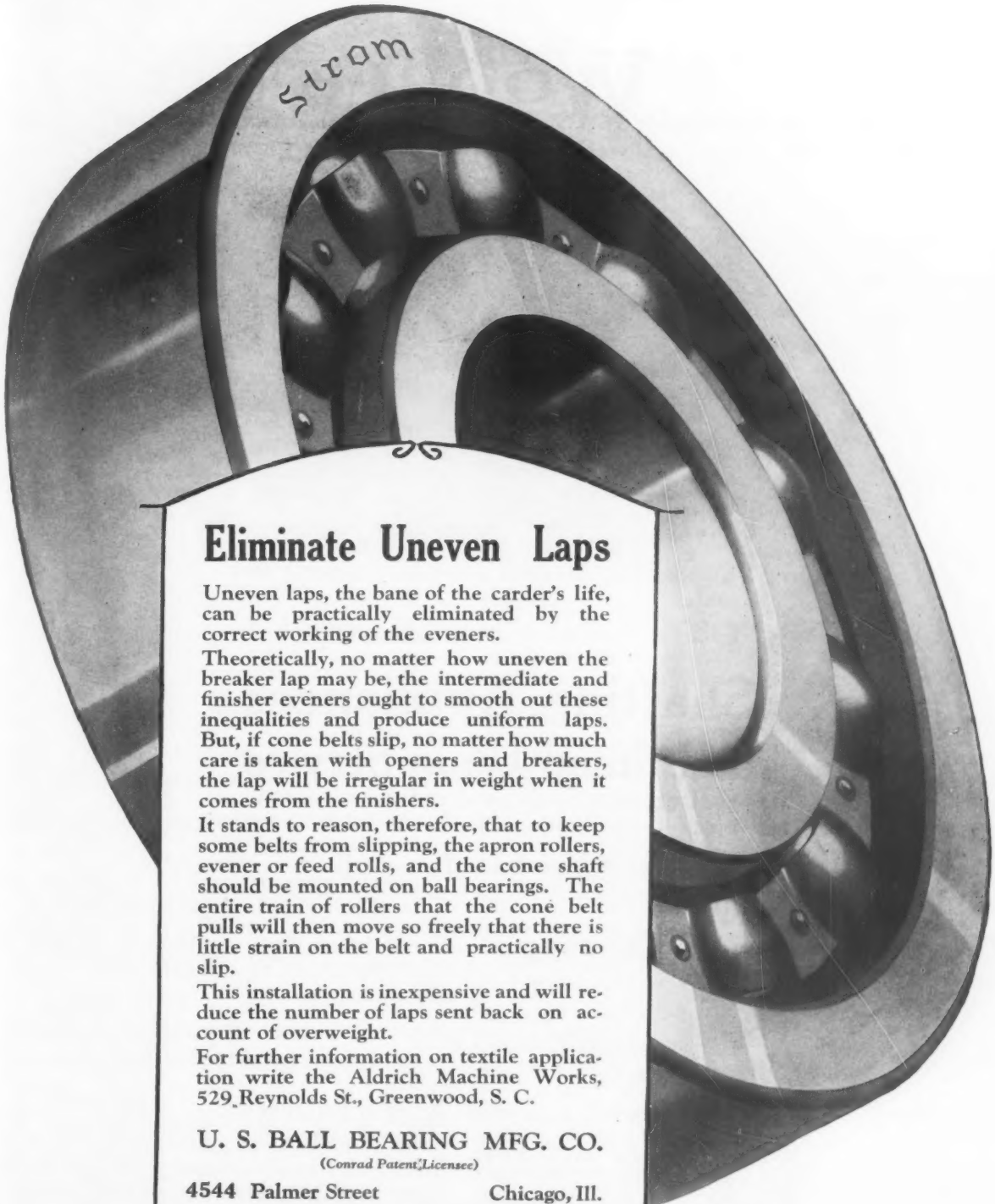

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Uneven laps, the bane of the carder's life, can be practically eliminated by the correct working of the eveners.

Theoretically, no matter how uneven the breaker lap may be, the intermediate and finisher eveners ought to smooth out these inequalities and produce uniform laps. But, if cone belts slip, no matter how much care is taken with openers and breakers, the lap will be irregular in weight when it comes from the finishers.

It stands to reason, therefore, that to keep some belts from slipping, the apron rollers, evener or feed rolls, and the cone shaft should be mounted on ball bearings. The entire train of rollers that the cone belt pulls will then move so freely that there is little strain on the belt and practically no slip.

This installation is inexpensive and will reduce the number of laps sent back on account of overweight.

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"Wherever a Shaft Turns"

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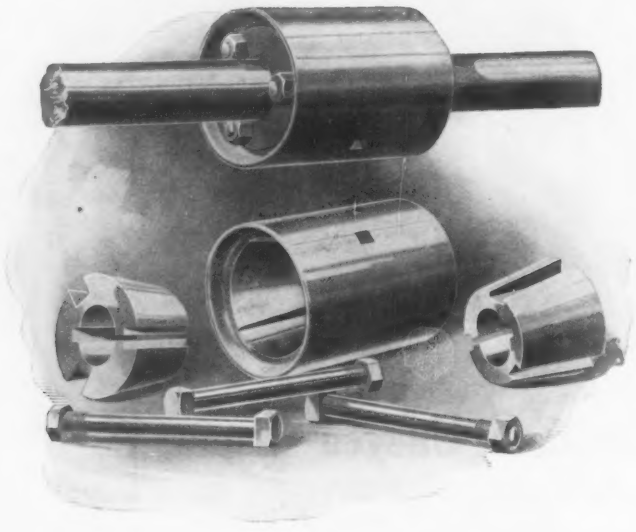

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So designed that a slight variation in shaft sizes will be overcome and perfect alignment insured.

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ECONOMY is where quality determines the price, not where price controls the quality.

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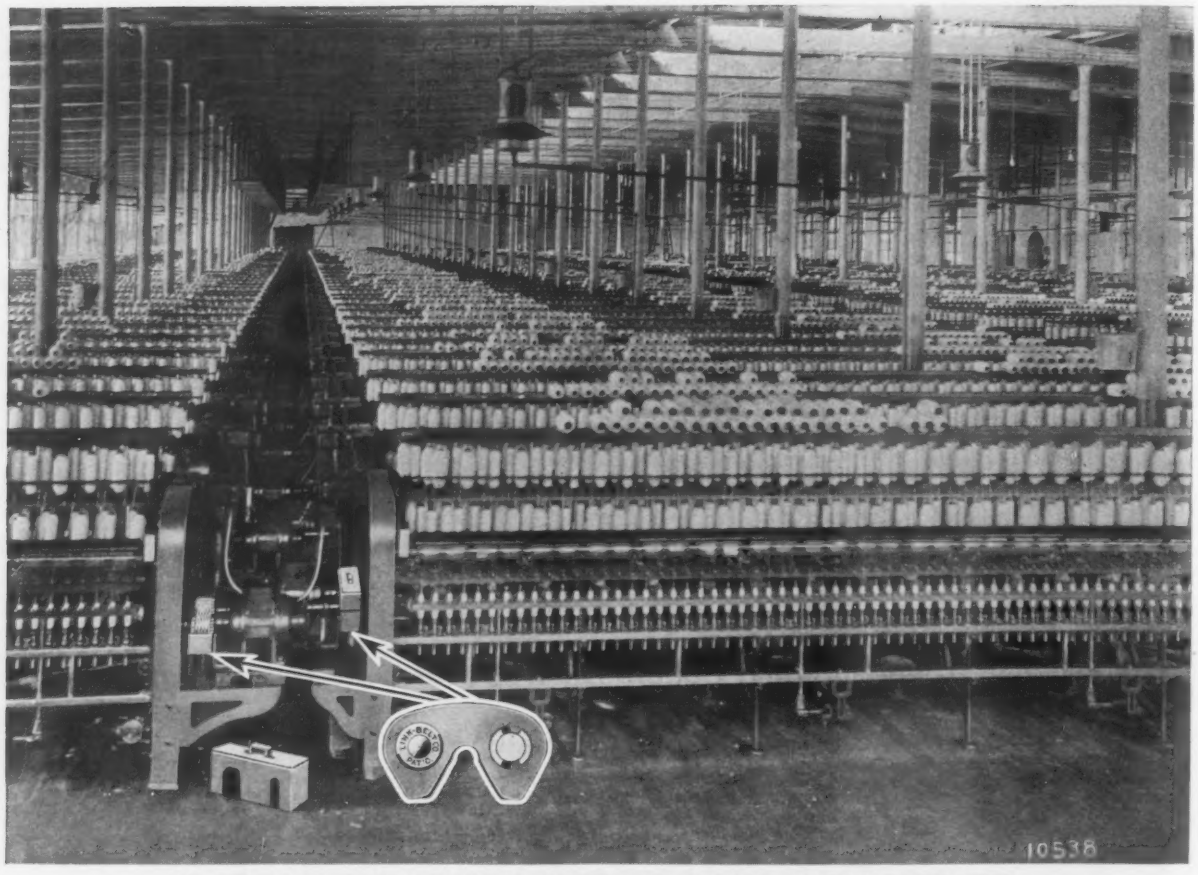

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SPINNING machinery is costly. It represents a big investment. Your returns on this investment are dependant on two factors—labor and the machine's efficiency.

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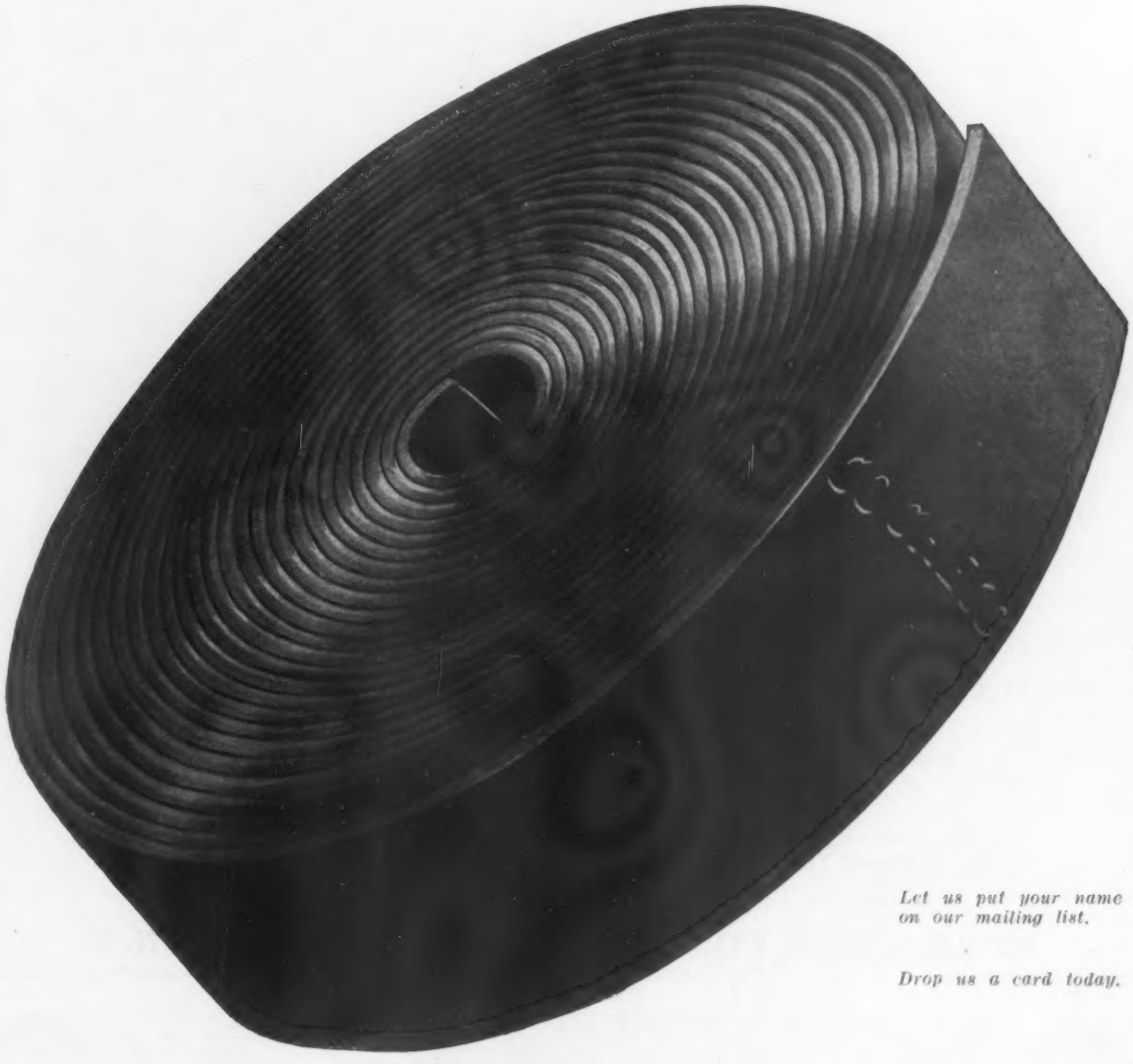

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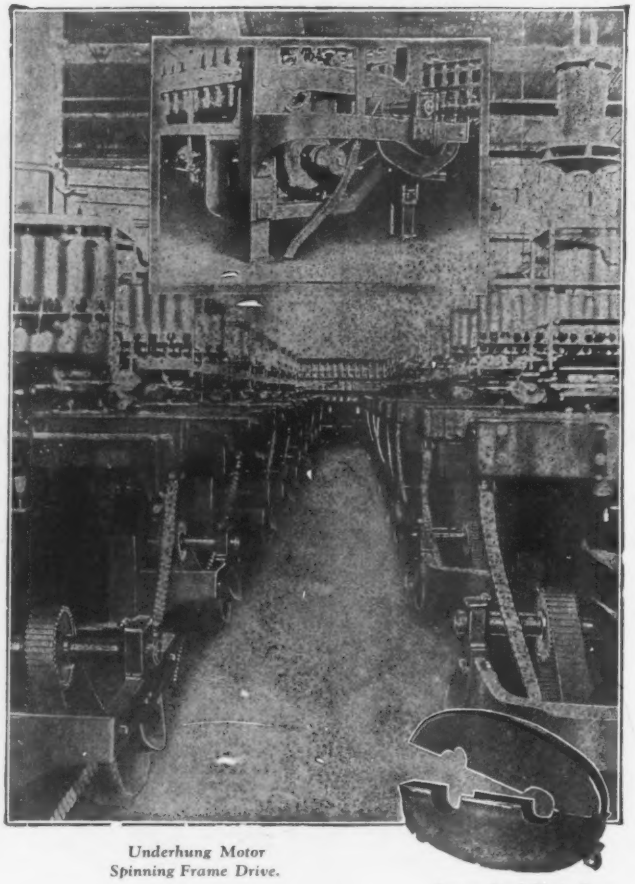

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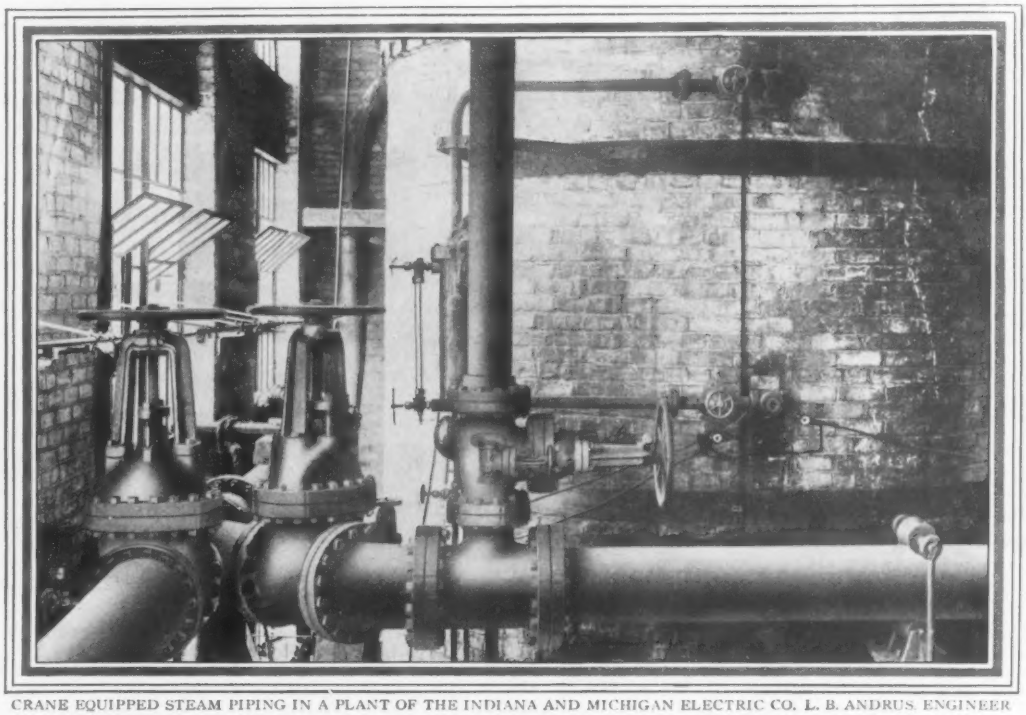

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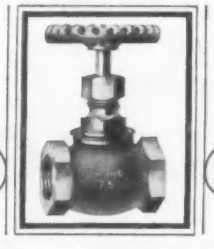

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FOR months to come heat will be a bigger item than ever in your drying costs. Heat means coal, and the coal shortage means higher prices.

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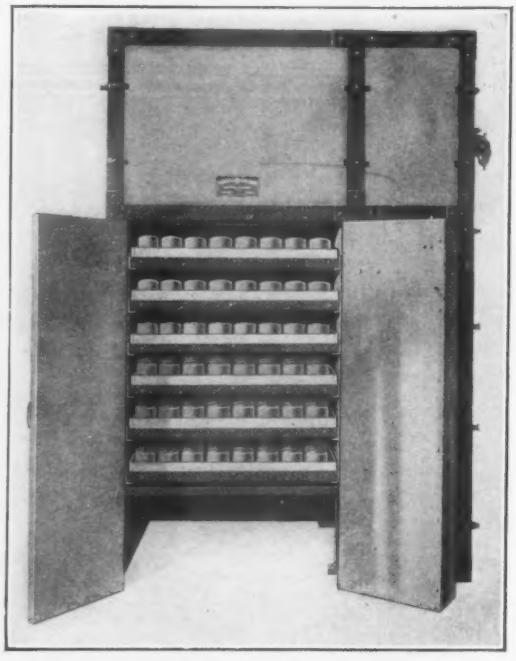
We will gladly send you illustrated descriptive booklet; and we would welcome an opportunity for our engineers to explain to you personally the economy and other advantages of our textile drying equipment. Address Grinnell Co., Inc., 266 West Exchange St., Providence, R. I.



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COTTON

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CONTENTS

EDITORIAL—

"Mellifluous Phraseology" 91

What Has Become of Our Sea Legs?..... 92

Freight Rate Investigation and Adjustment..... 93

GENERAL AND TECHNICAL—

The Banding of Spindles 94

Two Halves Make A Unit 97

Determining Costs in a Cotton Mill..... 98

Humidity in Cotton Mills 103

What the Southern Mills Are Doing..... 105

The New England Mill Situation..... 107

Meetings for New England Operating Executives 110

Cotton Comment 110

Inventions in Textile Equipment 112

Notes About Men You Know 114

An Old Timer Says— 117

HOW OTHER MEN MANAGE—

Mechanical Laws and Machine Design 119

Some Causes for Seconds 121

More Light on the Chinese Mill Problem 123

Finishes for Netting 125

How Should Waste Be Figured?..... 127

Character in Cotton 127

Dimity 129

A Stripping Device for Cards with the Flat Direction Reversed 129

Beam Weights and the Weather 131

Practical Comments 133

A Static Eliminater 135

Card Flat Speeds 135

Card Flat Speeds and Neps 137

The Work—Not the Frame 139

Sometimes It's the Spinning Room 139

Asks for Comber Information 141

Differentials and Fly Frame Winding 141

Standard Room Cost 143

"Wash" Finds Some Heavy Drawing Sliver..... 145

Why the Other Fellow Gets the Job..... 145

Uneven Kier Boiling 146

Circumstances Alter Cases 146

KNITTING SECTION

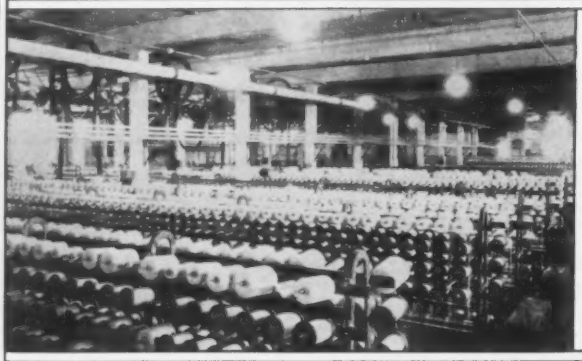
Sodium Sulphide 149

The Yarn Market 153

Among the Knitting Mills 154

The Knit Goods Market 159

Hyatt Equipped Spinning and Twister Frames Daily Become More Popular With The Mills



The economic advantages of Hyatt roller bearings as applied to the cylinder shafts of spinning and twister frames are making them very popular with mills where production costs are held to a minimum.

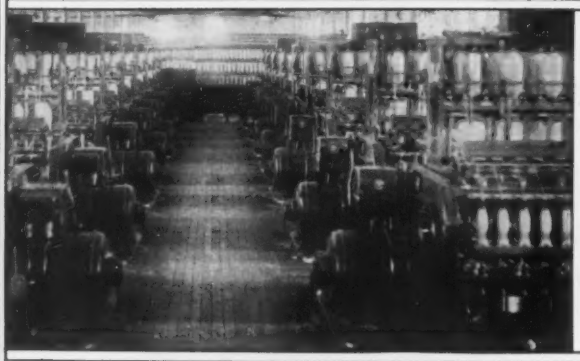
These advantages are Power Saving—Oil Saving—Durability.

Power Saving—carefully conducted tests under practical operating conditions in several mills have proved that Hyatt roller

Above: Some of the 40 Hyatt roller bearing equipped heavy twister frames built by the Whitin Machine Works, Whitinsville, Mass., in operation at the Fairhaven Mills, New Bedford, Mass.

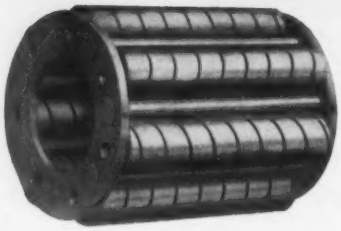
At right: Tecumseh Mills, Fall River, Mass., are operating 18 Hyatt equipped spinning frames built on specification for them by the Whitin Machine Works, Whitinsville, Mass.

Below: At the Narragansett Mills, Fall River, Mass., they have 18 spinning frames Hyatt roller bearing equipped, made by the Mason Machine Works, Taunton, Mass.



bearings save more than ½ HP per frame on Whitin frames. At a power cost of $40.00 per HP per year this amounts to a real saving of $21.20 per year per frame.

Oil Saving—The usual practice in oiling Hyatt bearing frames is four times a year instead of the weekly oiling required by plain bearing frames. Four oilings a year instead of fifty-two save money in lubricant and the labor to apply it.



Durability—Hyatt roller bearings by reason of their friction eliminating design and their chrome-vanadium steel rollers, operate throughout the life of a machine without adjustment or replacement.

Considering these three important money saving advantages, can you longer afford to operate plain bearing frames when the cost of applying Hyatt roller bearings to new or present frames is only about $35.00 per frame?

Ask your frame manufacturer for Hyatt bearings or write to us for complete information.

Hyatt Roller Bearing Co.

Industrial Bearings Division **New York, N. Y.**

Motor Bearings Division, Detroit
Tractor Bearings Division, Chicago
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USE HYATT BEARINGS ON YOUR LINE SHAFTS TOO BULLETIN 123

With the Publishers

Felicitations

As we approach the annual holiday period the contradictions and inconsistencies of the past year trail out behind us like a string of empty box cars tagging the powerful drawbar of a Mallet compound.

Emerging from the disastrous period of readjustment resulting from the deflation of nineteen-twenty-one, the cotton industry had barely considered the possibilities of the present year when the strike in the New England section was announced. Following this came the strike of the coal miners in April, and the railroad disturbances in July, while during the entire period, the cloud of an impending tariff change unsettled business values, and the threat of an enormous soldiers' bonus, based on political expediency, deadened business incentive.

But Thanksgiving Day finds the textile disturbance practically settled; the coal difficulty temporarily deferred; the transportation imbroglio probably nearer a mutual appreciation on the part of its participants of the power of public sentiment than ever before in the history of the railroads; and the new tariff bill, in its weakness or its strength, a known and recognized factor. This leaves the soldiers' bonus question, blocked for the time being by presidential pluck, and the possible revival of the war time excess profits tax by the newly elected and so-called progressive element in Congress, as the two political ghosts of domestic origin that may be expected to rattle their bones and show other signs of a reviving longevity.

The net result of obviating or deferring these obstacles to confidence in conditions has been a pronounced improvement in textiles as well as in general business. With this improvement in demand has come an approach toward parity between the prices on raw cotton and the finished product that has been lacking for many months. Mill construction and improvement is again in progress, and the financial situation, in the South at least, is quite satisfactory.

Therefore, as we look forward to the holiday season in good cheer, we wish to impart that feeling of gladness to you as we assure you of the pleasure, enjoyment and satisfaction we have obtained from our mutual business association, and wish for you and yours the old, old wish—

A Merry Christmas

and

A Happy and Prosperous New Year.

AMONG COTTON'S READERS

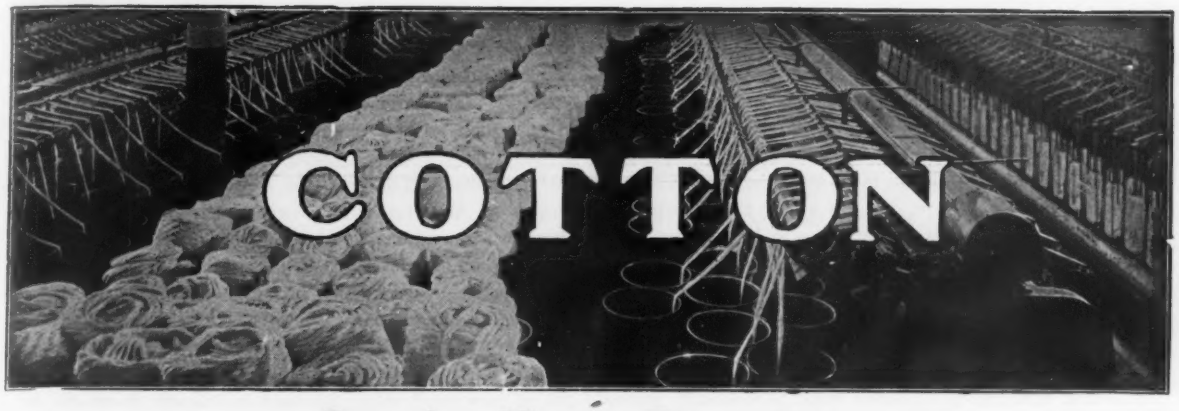
CASON J. CALLAWAY

Director Sales and Finances

President, Manchester Cotton Mills, Manchester, Ga.; Milstead Manufacturing Co., Conyers, Ga.; Treasurer, J. T. Perkins Company, Brooklyn, N. Y.; Treasurer, Unity Cotton Mills, Elm City Cotton Mills, Hillside Cotton Mills, Valley Waste Mills. LaGrange, Ga.

"I want to record my appreciation of the services which you are rendering to the cotton manufacturing industry through your excellent journal COTTON. It is a praiseworthy example of the real usefulness which may be achieved by an organization imbued with a spirit of service such as yours."

Cason Callaway



December, Nineteen-Twenty-Two

"Mellifluous Phraseology"

Man lives not by bread alone, someone has paraphrased, but chiefly by catch words. The story of politics is largely the history of shadowless phrases, even to a greater extent than history being, in Carlyle's term, the elongated shadows of great men. How thrilled we were only a few years ago by such sonorous slogans as "the rights of small nations," "self-determination," "the freedom of the seas," and the fight "to make the world safe for democracy." They served their purpose, not altoether a bad one, and passed into history unapplied; for it is all but impossible to apply to the complex affairs of life a mere abstraction, no matter how fine and just it may seem to be.

Now there hovers over national politics another phrase which, as construed by its proponents, is, like most of those that have made colorful the currents of history, both unanswerable and inapplicable under any system of life so far proved to be safe or tolerable. It is "a living wage." We shall hear much of it; it will be the cause of much fine eloquence in Congress; it may be an uppermost "issue" in the national campaign of 1924.

It was given a measure of solid standing when Congress provided that the United States Labor Board should take into account the cost of living in fixing rates of wages for railroad employees. This leads many persons to argue that it is the Board's legal duty to provide for nothing less than "a living wage" for any and all employees of the railroads. The majority membership of the board denies the contention and has denounced the term "a living wage" as interpreted by its exponents as nothing more than "mellifluous phraseology."

The issue is thus brought within the realm of specific discussion. It is a dangerous issue, as generally are those which are expressed in "mellifluous phraseology." For it involves very abstruse if not impossible definitions, ones that can neither be stated in rhetorical generalities nor in cold, concrete facts. And there's where the trouble lies, as with all such discussions. It truly has been said that the greatest misunderstandings have been caused not by differences in purpose or desire, but by disagreements on the meaning of words or phrases.

Almost any interpretation can be given to "a living wage." If one wished to be extremely conservative it could be contended that the very law of existence makes it necessary that everyone receive such a wage in some form, or otherwise one could not live. But when you get beyond the bare needs for life's sustenance—and even those cannot be accurately defined for groups by the statistical process—it becomes a mere matter of opinion as to what comprises a true living wage. Beyond the act of remaining alive, no one can define even what constitutes living; in fact, it constitutes the same things for no two persons.

While there are considerable data on the cost of living, little of them are definitive. There isn't a person of intelligence who couldn't confound within the range of one's own experiences every conclusion based upon that data. Everyone knows of persons and families who live comfortably on incomes below those costs as statistically arrived at and of others who live badly on incomes much larger. For "living" is an art which comprehends much more than the earning of wages, however important that may be. Even assuming that those costs can be arrived at accurately for all or a given number of people, to base wages on those findings alone would be manifestly unjust to the frugal, the enterprising and the industrious.

Just so much exists or is produced to be divided among all who should share it, in the form of wages or other income. Our national production, measured in dollars at present price levels, is between $50,000,000,000 and $60,000,000,000. A minimum wage of about $2,100, as claimed by the sponsors for the railroad men who have raised the issue, for all the 41,500,000 workers shown by the last census to be engaged in "gainful occupations" would call for a national income of nearly double what it is at present. This even would allow nothing for payment of wages above the minimum of a bare "living wage" to persons of extra skill, intelligence or responsibility, and nothing for the use of the savings accumulated by the frugal and enterprising, savings that take the form of property or capital. If all these needs were met it would be necessary to treble the national income in order that every worker might receive what many claim to be a minimum "living wage."

Of course, it isn't claimed as yet for everyone, but if it should be guaranteed by the Government to anyone, why not for all? Why should the workers in one industry alone be given such a guarantee, obligative on workers in other industries, as well as on capital? In fact, to assure it for all would be the ultimate and just demand once it was established for one. And to guarantee it for all, even on the most conservative statistical findings having to do with the monetary cost of "living," would be a palpable impossi-

bility, even though all personal income were reduced to a single level.

That the real income of the nation can be greatly increased there is no more doubt than that a more equitable distribution of it is possible. But it can't be increased through the application of a rhetorical theory which, in practice, would give to many more than they earn or need, and much less to a large proportion of the enterprising and deserving. Production thus would be decreased because of the premium placed on improvidence and the penalty put on industry and intelligence. In the end the distribution would be a hundred times more inequitable than at present.

This ultimate effect of the national application, as a controlling premise, of "a living wage" statistically arrived at, has been realized as inevitable by several former sponsors of the theory in New Zealand, where attempts have been made to apply it far more extendedly than has been seriously proposed in this country.

As a mere economic theory, the discussion of "a living wage" will be productive of much good, for it will remind employers of the importance, as well as the good business principles, of doing all they can to see that workers receive incomes sufficient to sustain healthful and wholesome life. But to write into the law the requirement that any group of workers must receive what is more or less arbitrarily defined as "a living wage" is to take a step that, unless retraced, would lead to the doing of great injustice and possibly to economic and social revolution.

The recent election appears to place the ultra-radicals in a position strategtically powerful in the new Congress. This makes it all the more important that the voter give unusual attention and study to subjects that can be dealt with so easily and so dangerously in terms of "mellifluous phraseology" as that revolving around "a living wage."

What Has Become of Our Sea Legs?

When, about 80 years ago, DeTocqueville wrote his classical book on "Democracy in America," the United States dominated the shipping of the world. The fact rather amazed the famous French philosopher. Here were a people without maritime traditions, a country where wages were the highest in the world, where construction costs were higher than any other, whose per day cost of operating vessels was the highest of all countries sharing the world's shipping. Yet in 1832 90 per cent of our imports came to us in our own ships and 75 per cent of our exports were carried in vessels of United States registry. Our ships also all but controlled the Mediterranean and the China trade.

DeTocqueville looked for the reason. He found that it lay in the superior initiative, enterprise and boldness of the American ship owner and seamen. Our supremacy at sea did not long continue. Following the Civil War our shipping declined until at the beginning of the Great War it comprised only a few thin and dwindling fragments. When we entered the war we were all but helpless at a most vital point, ocean transportation facilities. In a few years, as a war endeavor, the Government spent more than $3,000,000,000 on the construction of ocean-going ships. To-day we have more than 1,500 steel vessels of aggregate tonnage second only to that of British registry. Yet only one-third of our vessels are in operation. The others are rotting at anchor. Those that are in operation are costing the Government around $50,000,000 a year over and above their earnings. Our ships now carry less than one-third of our exports and even a smaller proportion of our imports, and they handle only a negligible portion of other important business. Aside from the waste involved in failure to realize on the stupendous war investment in ships, the status of our merchant marine bears mightily on the internal economy and safety of the nation.

A foreign vessel putting in at New York takes on a shipment of goods for a South American port. In its cargo are goods shipped from its own country. To which does it give the best attention? The shipment from its own country, of course. A shipping agent at a South American port has a cargo to place. If the choice is between an American vessel and one, say, of his own European country, which does he favor? His own country's vessel, of course. No country can have a distribution of shipping agencies controlled by its own nationals throughout the world without ships for them to deal with. We become involved in war. Upon whose ocean-going shipping can we depend for supplies from other lands? Only our own.

Thus no argument can be made against the maintenance of a merchant marine of our own. All agree on that. The only difference of opinion is as to how it shall be maintained.

There we enter into many complications. One reason why our merchant marine, once the proudest the world has known, dwindled to almost nothing was the subsidies granted their shipping by other countries whose vessels drove ours from the seas. More than twenty years ago, Mark Hanna, as United States Senator, urged a like policy upon our own Government. Had ten times as much as Hanna proposed been spent on our shipping from the day he first urged it to the present it would not have totalled as much as our war venture into ship building and operation has cost the taxpayers. If the results of the war venture has proved anything, it is that ship building and operation are endeavors that cannot be carried on with success by the Government.

But those Americans who would build and operate ships say they can not meet the competition of other nations which do subsidize, particularly under restrictions that amount to penalties put upon our ships by Federal laws. One of those laws is the LaFollette bill, which so affects the selection and pay and discipline of seamen on American vessels that the costs of operations are made much higher than are those of the vessels of other countries. Another is the prohibition amendment which is to be enforced on ocean-going vessels of American registry.

Therefore the Government is unable to sell its vessels to persons who would undertake to operate them under American registry, and, as indicated, the Government itself is unable to operate them profitably.

It is now proposed that a direct subsidy of private operations of American vessels be resorted to. The subsidy provided by the bill pending in Congress would amount to from $50,000,000 to $75,000,000 a year. It gives to the United States Shipping Board wide powers over its distribution.

Other countries threaten us with retaliatory measures in case our subsidies have injurious effect on their shipping. What will happen in case they "raise the ante" in the form

of additional subsidies that may nullify the effect of ours? Of course we can outspend most of them, but if it came to that, would an established and secure merchant marine be the result any more than it has resulted from our orgy of spending on ships during the war?

But in considering all the side issues, no one should lose sight of the fact undisputed by all that we should have a safe and secure merchant marine and that it is well within our rights to develop one. And it seems clear that one cannot be established and maintained without Government aid.

However, one is tempted to ask what has become of that initiative, enterprise and boldness on the sea which charmed students of our life during the first half of the last century? We still display it in other realms—in none better than that of textile manufacturers, which is concerned very pertinently with the question of a merchant marine.

Whether one favors subsidies as a principle or those suggested in the marine bill now pending in Congress, one can hardly deny that any move in the direction of building up and sustaining our foreign shipping will be better than failure to do anything about it. No subsidy scheme so far proposed would cost more than inaction is now taking from the pockets of the taxpayers in the form of rotting vessels and excess costs of governmental operation.

General Class Freight Rate Investigation and Adjustment (I. C. C. Docket 13494)

A question of vital interest to all southern cotton manufacturers is now being considered before the Interstate Commerce Commission. This case amounts to a thorough overhauling and complete revision of the entire interstate class rate structure in the southeast, and will later involve a revision of all interstate commodity rates.

By reason of the development of this case, an unusual opportunity has come to the southern shippers to have a hand in fixing the rates on which the commerce of the South shall hereafter move; an opportunity, in fact, to shape the economic basis on which the industry of the South shall be developed in the near future, not only from a standpoint of rates in the South, but the basis on which interchange of commodities between the South and the Central West and the East shall be made, insofar as freight rates are concerned.

For several years—as is well known to all informed shippers and traffic representatives of the South—both the Interstate Commerce Commission and the carriers have had in mind a general revision of the whole interstate rate structure of the section. It had to be. The old basing point system in the South had broken down in places and was obsolete in others under the changed conditions. The old system was filled with long and short haul violations and condemned in the amended law enacted by Congress. Numerous complaints had been filed with the Commission for discrimination and undue preference, forbidden by law, as relates to the carriage of goods in interstate commerce.

Early in 1921, the carriers had, at the suggestion of the Commission, invited the shippers to meet with them for the purpose of undertaking an agreement as to the basis on which interstate class rates in the South could be revised in order to bring them in conformity with the law and to remove many causes of complaint and prevent litigation before the Commission. Conferences were held in Atlanta in June, 1921, at which time, failing of agreement between shippers and carriers, it was agreed that the differences should be arbitrated by the Interstate Commerce Commission. Docket 13494 was instituted by the Commission for the purpose of bringing into review in one comprehensive record the entire southern class rate structure.

The case involves all interstate class rates within the South (between all points); also all interstate class rates between the Southeast and the Central West and the East; and this case also involves the removal of differences between state and interstate rates throughout the South, and it is designed to pave the way to eliminate LCL commodity rates and interstate exceptions in the southern classification; and later a revision of the commodity rates in carloads.

Hearings began in Atlanta early in June, 1922, when the carriers undertook to present a system of rates for application in the South based largely on distance as the controlling factor, with uniform percentage relationship of the lower classes to the first class rate. They propose a maximum mileage scale of class rates for state and interstate application, the same to be departed from, as in their judgment seemed to be justified, together with a proposal to cancel all the LCL commodity rates and exceptions to the southern classification, with certain reservations as to the latter. The carriers took 30 days to present their testimony, requiring several thousand pages and hundreds of pounds of rate and statistical data.

The system of rates proposed by the carriers seemed so unjust and unreasonable to the shippers as to afford an opportunity to the shipping organizations of the South—through the Southern Traffic League—to submit a proposal of rates in lieu of the rates submitted by the carriers, that would do substantial justice to all sections. The shippers of the South—or at least most of them—organized in the Southern Traffic League, have proposed an offer to the Commission for adoption, a basis of rates that will be just to all shippers throughout the South and designed to remove all cause of complaint of discrimination and undue preference where found to exist. A mileage scale of class rates has been proposed by the Southern Traffic League for application throughout the South, with uniform percentage relationship of the lower classes to the first class rate; modified only to the extent that may be necessary to give to North Carolina, on business between the Central West and North Carolina, a basis of rates less than the full combination of local rates to and from the Virginia cities, etc.

The chief points of difference between the system proposed by the carriers and that proposed by the Southern Traffic League are: (1) the first class rates proposed by the Southern Traffic League are materially lower than the first class rates proposed by the carriers; (2) the percentage relationship of the lower classes to the first class rates proposed by the League are also lower than the percentage relationship proposed by the carriers.

Shippers feel that the basis proposed by the carriers amounts to a substantial increase in the general rates throughout the South; and that the basis of rates they propose will take care of the existing revenue of the carriers and will pave the way for an elimination of LCL commodity rates, and cancellation of the exceptions to southern classification proper. The basis proposed by the

shippers looks to the disparity in the level and relationship as between rate structures of the South as a whole, in comparison with the level and relationship in the trunk line and CFA territories, being removed and those two great rate territories being brought into closer relationship and harmony with each other.

To enable the Southern Traffic League to participate in this important rate case and protect the shippers in the South it has been necessary to call for a fund of about $30,000 to fight this case, and it is absolutely necessary that all shippers, industries, etc., who are vitally interested in this rate revision, come forward and contribute their share to the fund being raised to contest this rate case, as it will amount to almost a calamity to the shippers of the South if this case goes against them and the high rates as proposed by the carriers are adopted. It is only by cooperation with and through the Southern Traffic League that the shippers of the South have an opportunity to protect themselves in this matter, at a cost much less than the individual shippers and industries could do for themselves; hence the necessity and importance of every shipper doing his part to cooperate with the Southern Traffic League in this matter. There is no time to be lost, as if these high rates as proposed by the carriers are put into effect, they will prove disastrous to many of the shippers and industries in the South.

The Banding of Spindles

BY THE AUTHOR OF "SPINDLE SELECTION AND CARE."

PART ONE.

Successful spinning and twisting of yarn and thread depends to a large extent upon the proper driving of the spindles. The oldest method of accomplishing this is by cotton bands, although the tape is now coming forward as a serious competitor. Only the band will be treated here.

Of the two types of bands—twisted and braided—it will be conceded that the latter is superseding the former, especially on machines making medium or fine counts. While the twisted band undoubtedly has one advantage in that the knot occupies less space, since only one-half of the thickness of the band is used, yet the quicker breaking property, once it starts giving, causes the balance to tip in favor of the braided band.

Should bands be of yarn or roving, or a combination of both? What is wanted, of course, is a band with a rapid transverse rupture once it starts breaking. For this reason, roving is undoubtedly better than yarn, because it is pretty generally known with what tenacity a lone strand or two of yarn will hang on long after its neighbors have quit work. Obviously, such a band will make slack work until it is detected and removed, or until it eventually yields to the inevitable. No doubt, however, experimentation will enable each mill to determine this matter to its own satisfaction. Tests in connection with varying the material and the arrangement of a band's composition will also bring to light the wearing quality.

Whether this latter quality is improved by dyeing the bands is still further a matter for investigation, as well as whether such a procedure will render the bands more impregnable to atmosphere changes.

So many factors enter into banding, kind of material composing the band, yarn or roving, and whether hard or soft twisted, the number of strands, the stretch given the banding, the initial tension when tying, and the atmospheric conditions prevailing in the room, that unless the tests are pretty carefully conducted, results are not always reliable.

Men of science, when conducting a test, change only one condition at a time and note the results. Unless something like this can be done—a difficult task in mill work—the best advice, perhaps, is for a mill to stick to one known good quality or grade of banding. Haphazard changing from one brand to another is not conducive to the most efficient results. A certain make running well in Massachusetts may be condemned in Georgia, not because it will not do just as good work in the latter state, but because at the time of experimenting, the conditions affecting the band were not identical in the two places.

The proper size of banding should receive careful consideration. For new frames, this matter is particularly necessary as it often determines the speed of the cylinder. Since the speed of spindles is largely standardized, a change in the size of the banding, once the prime mover of the machinery—motor or pulley—is definitely in place, will cause a departure from the standard; moreover, as the management often inexorably holds these standards as inviolate, a faulty decision respecting the size may eventually lead to an extremely embarrassing situation. A 30s band is naturally more rugged and enduring than a 25; a 20 stronger than a 15. The largest band conformable with the requisite speed would seem the proper course. The size of bands on spindles already in use is necessarily restricted in its maximum size direction by the shape of the spindle whirl bottom. A long sharp V-bottom, obviously, will show a greater variation—lower speed with bigger band, and vice versa—when the size is altered, than a round, or U-bottomed whirl.

Worn V-whirls result in a higher speed than the standard calls for. Such spindles can sometimes be fitted with a larger band—a procedure often bringing about a twofold result:

(1) reduction of speed to somewhere near the standard;
(2) a revival of the life of the spindles, on account of the larger band having a fresh point of contact in the whirls.

The load to be carried, and the weight of the spindle should be held in mind when selecting a band.

It is a well-known fact that bands are very susceptible to changes in weather, showing now a contracting, now an elongating tendency. For this reason, the stretching of the bands must be looked to, either at the braider, or just before the bands are put on the spindles. With the twisted loop band, a band-tier was expected to stretch each band individually as he put it on the spindle. There is perhaps less harm attendant on an overstretched band (unless, of course, the fibers are ruptured) than in a band not stretched at all. In the former case, the elastic nature of the band enables it to regain a part of its stretching property;

whereas a band subjected to no tension at all rapidly becomes slack after it has run awhile.

Braided banding usually comes in balls and must be reeled and cut to length in the mill. For the sake of efficiency first, and economy next, the right length should be settled upon and closely adhered to. A moment's investigation will show what this ought to be. Simply cut off a band on any machine and measure it, allowing 12 inches for the tails. The latter allowance gives each tail 6 inches —shorter than this makes it difficult to pull the knot tight; longer, means a waste of banding. To make it convenient for the bander to handle them, the bands should be reeled, cut, and then tied in bundles of 50 or 100.

A band-tier's equipment is simple. Few articles are required: a double-curved band rod, a knife, and a short

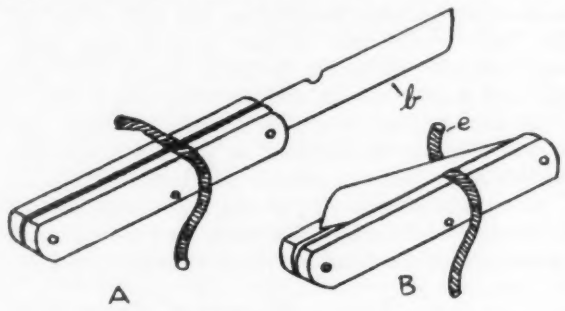


FIG. 1

hook for slipping the bands into the whirls. Sometimes the hook is not used, the bander putting the band into place with his forefinger. Finger pads to prevent blistering of fingers due to the strain of pulling a knot tight must also be provided; and they should be inspected occasionally to see that they are kept fit to work. The pads, by the way, should not be so long, nor so thick, that they impede altogether the movement of the fingers they encircle. The thickness can be decided upon in a few trials with varying layers of cloth or other material; whereas the length may perhaps be arbitrarily placed at 1½ to 1¾ inches.

Of the tools, the knife is the most important. It must be fairly heavy, 4 to 8 ounces, according as experience or conditions dictate (a light knife being easily whirled about by the cylinders), and must have a good quality blade. The latter, moreover, should move freely through a quarter circle—a requirement that distinguishes the band knife from perhaps every other knife whose blade closes down into the handle. The need for the freeness of the blade can be seen from a study of Fig. 1. At A is shown the knife with the blade (b) thrown back, a band end across the handle; B illustrates the band end (e) clamped into place securely by the blade. The band in turn locks the blade, holding it tightly until after the band has been put over the cylinder and is ready to be tied when a pull on the band instantly releases the blade. This could hardly be done with a blade held tight by a spring. The clamping action is readily accomplished. A simple twist of the wrist, and the blade is thrown back as in A, ready for the band; after this the index finger of the left hand—the hand holding the knife—flips the blade over the band, this action being supplemented by the left thumb pressing the blade home, as shown in B.

One of the secrets of longevity of bands is in the knot. Above all things it must be a square knot. Too much stress cannot be placed on this point. When banders are changed for any reason, drum carefully into the new men that a square knot, and a square knot only, is wanted. The frailty of humanity is notorious—and banders, or banders-to-be, are no exception. Constant repetition, sometimes to the point of weariness is required to make the square knot a second nature habit with them.

Fig. 2 shows a square knot. A shows the first tie (for convenience in following the discussion, one tail is blackened); while B indicates the completed knot—purposely left loose in the sketch. It will be noted that both tails 1, and 2, are on the same side after the knot is tied. In tying, it should always be remembered that when a tail is over or under on the first tie, this sequence must be continued on the second tie—that is, to the completion of the knot. This point is important, and must be thoroughly drilled into the men. A glance at the sketch A shows the tail (1) is over in the first tie; and that this arrangement is followed out in the completed knot, as depicted at B.

The feature which recommends the square knot as the best knot for banding purposes is that the harder the stress on the ends (e) and (e^1), Fig. 2, the tighter the knot becomes. This statement may be quickly verified by simply taking a band in the hands, tying a square knot, and then grasping the band at convenient points, pulling against the knot—the harder you pull, the smaller and harder the knot becomes.

As only two ties are necessary for a square knot, the practice of adding more ties is not only a waste of time, but may even prove the means of the early destruction of the band. This assertion will be understood when one thinks of the extra bunch that a third or fourth tie gives to the band, causing the knot to strike against the knee-protectors of the workers—especially in the doubling department. A two-tie knot will have plenty of room and to spare in the spindle whirl.

Knots should always be tied wet; for a dry tied knot slips. Experimentation along this line proves interesting. The water helps to bring the knot to a smaller compass

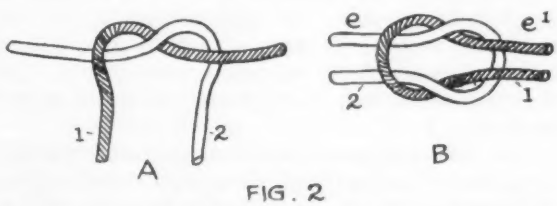


FIG. 2

than is the case where the knot is tied dry; it also serves as a binder until the knot has become, so to say, crystallized—that stage where the oil, dirt, and so on, through the action of friction, have the knot almost a solid.

Discretion is necessary in wetting the tail ends of the bands. Moisture, as is well evidenced on damp days, affects bands adversely; therefore wet only far enough so that the water line extends a half-inch or so beyond the knot when tied.

An even, lateral pull is best for bringing a knot together squarely, and compactly. No jerking, first at one tail, then at the other, as if one were dealing with a balky horse, should be permitted. Many a knot, perfectly tied, has been yanked out of square by this procedure. In connection with the tying of the knot, the question often arises: should a bander merely bend over when tying the

knot, or should he stoop, resting his haunches on his heels? The latter is the preferable method. It takes some time, certainly, before a bander becomes hardened to this position; but the fact that he can look right at the knot and note how it is being tied, and that he can pull evenly on the tails, is well worth bearing in mind.

Tails should be cut to within an inch of the knot. If left longer than this, they whip, particularly on narrow gauge frames. After the bands have been running a short time, these tails disappear entirely and the knot becomes a mere pellet, and hard as stone.

Occasionally one has to deal with a band that persists in slipping while the knot is being tied, a circumstance undoubtedly tending to jeopardize the making of a perfect knot. Only much practice enables a bander to handle such a band properly. As an aid to the early attainment of this facility, it may be suggested that the first tie be made a little to one side of the spindle base. To illustrate: note the position of the first tie in Fig. 3. Here the tie is some distance from the center; accordingly, when the band begins to slip in the direction of the arrow, the bander has more time to tie the knot than would be the case if the first tie were just at the center or on the other side of the center. Unless this point is followed up, and the banders taught how to do the trick, it is obvious that these slipping bands will preclude the making of a square knot.

The wrecking of a square-tied knot is also sometimes brought about by a dull knife-blade. This achievement may be banked on as a certainty when a bander is observed sawing away at the tails. Banders, therefore, should be shown why a sharp blade is requisite for trimming the knot tails cleanly without disturbing the knot; furthermore, they should be compelled to keep their knives in keen cutting condition.

Initial tension is mentioned in textile machinery catalogs, and in textile text-books. But in actual practice, among the men who have the immediate oversight of the banding, section-hands, second-hands, overseers, and so on, initial tension is an expression often as meaningless as Egyptian hieroglyphics. Too tight or too slack are the usual terms denoting the extremes, while the great expanse between them is left for the tension guessed at as "just right." Tension indicators are probably never seen, or even heard of.

And yet initial tension is very important. Not only is the life of the band itself often greatly shortened, but the longevity of the spindle, too, may be threatened through ignorance of the principle of initial tension. As long ago as the last quarter of the 19th century, tests for initial tension showed that for every pound additional beyond that required to drive a spindle properly—about 2 to 3 pounds—the power needed to drive the spindles is increased 13 per cent. Of course, a band must be tighter at the start than is actually required to drive the spindle at the proper speed; but this is simply to prevent the slack that would otherwise ensue before a band was anywhere near the discard stage.

Sometimes one thinks that the bands can be marked at the point where the initial tension will be about right, thus believing that some approach to uniformity will follow. Marking the bands for this purpose, however, is not a successful operation—the many factors entering into the problem make it impractical. For instance, the bands may not always be uniform in material, and the stretch for this reason may vary; or the stretch itself may depend on varying conditions outside of the consumer's power to control; the spindles, moreover, are not always set at a uniform distance from the cylinder; the latter itself may not be just exactly in the center of the frame; and lastly the spindle whirls may vary, either through having old and new spindles in a room, or through old spindles not wearing away equally.

Burning of a band while it is being tied is also sometimes induced by excessive tension, although this difficulty can be brought about by the continued friction between band and cylinder when a bander is rather slow in his work. Old, rusty cylinders are more apt to give this sort of trouble.

The operation of banding is simple. Assuming that the bander is right-handed, he holds the open knife in his left hand, pulls a band from the pack with the right hand, places the band end across the knife, clamps blade and band with a quick movement of the thumb and forefinger of the left hand, and then seizes the band rod which may be placed on top of the creel, or propped against the bander's legs, whichever position is most conducive to speed.

Next, the knife is hung just over the forward bend of the S-shaped hook on the rod, the latter then being inserted between the spindles until the knife is suspended at a point

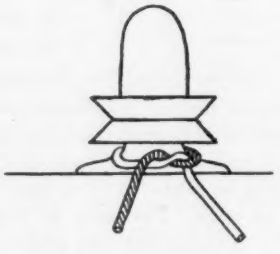


FIG. 3

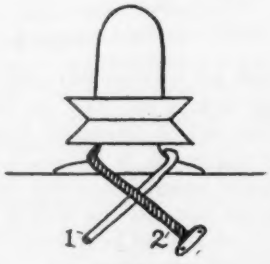


FIG. 4

just a little beyond the farther side of the cylinder. From here it is quickly dropped, rapidity in this movement aiding in getting the knife properly between two individual bands, whereas a dilatory action might result in the knife dropping through an opposite band, causing what is called a "crossed band." As soon as the knife is lowered, the band rod is in turn lowered below the cylinder and thrust forward, hooking the band and knife on the back of the S-bend of the rod, whereupon the knife is pulled to the spindle rail, and the rod, freed from the knife, is dropped to the floor.

It is better to learn to insert the rod on that side of the spindle which will obviate the need of pulling out the rod after the knife is lowered and then re-inserting it again on the other side of the spindle to fish out the knife. By inserting the rod as here suggested much time is saved as a moment's reflection will show—time which is quite a factor in those cases where the cylinder pull threatens to whirl the knife into the air. In relieving the hands of the band rod, after the band has been put over the cylinder and drawn to the spindle rail, preparatory to tying, the rod may be laid wholly on the floor, or what is better, it can be laid partly across the right foot which, when the bander has tied the knot, may be lifted, thus saving time and effort in regaining the rod.

(*Continued on page* 165.)

Two Halves Make a Unit

BY H. D. FETZER.

Capital is one half, labor is the other half—the two together make a unit of economic peace and prosperity. Like the two poles of a magnet, neither can perpetuate its existence without the other, and, like well mated man and wife, there is no enmity between them, but studious cooperation. Depreciation and taxes will consume idle capital, stagnation and starvation will destroy idle labor, but combined in productive activities, there is life, growth, perpetuation, and plenty, for all, and if it were not for the comparatively small number of Judas Iscariots, on both sides, economic peace and prosperity would reign supreme continually. Ninety per cent of the capitalists and ninety per cent of labor would always do right in the main, if let alone to act on their own initiative and judgment, and not interfered with by adverse and oppressive laws on the one hand and evil-minded and irresponsible agitators of fool doctrine on the other hand.

It is just here where some hard thinking by the rank and file of good people is needed, though not themselves capitalists. The uppermost question is: What is right for me, and what attitude shall I take in the ever recurring and current controversies, to make things go for the best, and, as a leader among help, what shall I say?

Capitalists are rightfully interested, and the superintendents and other operating executives in all of our industrial plants are their spokesmen to labor. If justice be done, and a prudent approach be made, with an open and rational presentation of business facts given, the answer can usually be forecasted with much accuracy.

And in this connection I wish to point out that in anybody's plant the overseer who gives forth an uncertain sound, or is in the least aligned with shallow-pated agitators, prating about imaginary ills and wrongs, is no overseer at all and no friend to prosperity, but is a traitor to everybody's highest interests. This statement is so plainly evident that, like the multiplication table, it need only be stated to be accepted as true. The overseer, like other operating executives, should be right, stay right, and realize his responsibility. We all, rich and poor, are dependent on the same thing for a peaceable and successful life, namely, economic harmony.

It aids one's mind in forming right conclusions to carefully survey one field of human endeavor at a time, and look the facts found there squarely in the face. Take the railroads—their strikes are highly illuminating; one per cent of our population standing in the way of our commerce and the needs and comfort of the other ninety-nine per cent of our people. And all on account of imaginary wrongs, hawked up by evil-minded agitators and sick counselors, who drove and cajoled the railroad men into doing a foolish thing against their own better judgment, and to the injury of both the people and the railroads, and besides their loss in time and wages, they also lost many friends.

Was there anything in it? Absolutely nothing but wicked advice, brazen effrontery, and human suffering. And yet the railroads are expected to submit to it meekly and not even try to better their circumstances, without asking permission of the government and the labor aggregations, as if the railroads in themselves were but a midget of importance. Blot out all the railroads of the United States for but one month, and imagine, if you can, the outcome. Then you would learn their worth—you would learn that they are the very life of our nation.

Yet they are the victims of an everlasting attack of parasites, barnacles, and grafters, from Congress down to the woodshed Justice of the Peace courts. These railroads, which are the greatest factors in our existence and welfare, are taxed to the limit by all kinds of special laws enacted by every state legislature and city council. Then they are soaked by preposterous damage decrees on all sides along the line. Then the government assumes to name the charges in passenger and freight rates they may make. Then they are prohibited from merging interests, like all other lines of activity may and do. And, then finally, in times of war or riot, they must be the main dependence of the government that studies to keep them well bled.

Is it not a remarkable layout of facts? But the strikers considered them not—let us hope for want of good counsel—but like a petulant, indulged child, bawled and kept a-bawling for everything in sight. But human reason would say to a man aboard a ship that springs a bad leak at sea: help to bail the water out and save the ship and your own hide. The war is over and all must help to bring things right again, for fair sailing. And seventy-five per cent of the strikers would have stuck loyally to the railroads if they had not been misled and ruined by bad advice, for they, like the rest of us, felt deep down in their hearts that was the only right and safe thing to do, because they are neither knaves nor fools, though they suffered themselves to be made such, in the eyes of the general public, at that unfortunate time, by some mighty rank, and mostly foreign, cattle.

The wide-spread coal mine howl, and the spotted textile strike are of the same kith and kin as the railroad troubles, with the additional feature, however, that the payrolls reveal the names of many more foreigners, who are all too often fugitives from justice in their native lands, and always promoters here of everything that is wrong and against our country's peace and our government, and watching to strike their fangs into anything that is decent. And just why our government does not debar that numerous band of sneaking serpents from our shore, I never could comprehend. But one thing is sure: the time has come when we had better quit running a zoo for all kinds of misfit human animals, or a reform school for criminals and semi-barbarians, "the public emergency requiring it."

But it is not the strikes, nor the mistakes of the government that I am after, except by way of elucidation of a murky question. It is higher, civil and patriotic duties of our American financial and operating executives in all of our industrial plants that I wish to stress. For many and many a man's mind is open to receive the wholesome doctrines of our government, if it were but given them by staunch Americans under the intimate and friendly relations that should exist between employer and employee. And this is an all-abiding responsibility, for you may be sure the devil has his imps busy sowing the seeds of destruction, wherever there is open soil. If an operating

executive cannot come up to this easy requirement he is not much of an executive, in fact he has been over-promoted, he has missed his calling, his gangplank is too short to land his help in safety, and he himself is short in mental and moral resources and convictions.

Every well-balanced mind can see that economic harmony between capital and labor is our only chance of country-wide prosperity, and that there is no other "Utopia" this side of Judgment Day. Then it is worth talking about at every convenience. Remember, all the poor will never be rich, nor will all the rich stay rich, for fortune is fickle, opportunity is open to all, and happiness comes only to those who labor honestly.

I have in mind a leading cotton yarn mill, where there is no friction between employer and operatives, and a strike is utterly impossible. Nor is there a single foreign name on the large payroll. This state of mind has been achieved by fair dealing on the part of the company and by a friendly relationship between operating executives and employees, whereby the co-worker spirit was developed throughout the entire force. By means of exercising a helpful spirit and by many personal talks on little and great duties as an individual citizen and as employee of an industrial plant, the real worth of a good job under pleasant circumstances has been understood, and a real feeling of confederated interests, almost amounting to a "home feeling," with a vital personal attachment to the concern has been achieved. Officers and overseers cooperated in this, aided by an expert social worker of ripe experience. Does it pay? Yes, a hundred per cent dividend. Is there anything in it? Yes, the difference between orderly loyalty and runious confusion. A wise general forestalls a ruinous engagement—a wise industrial management will make effort to do the same thing.

Determining Costs in a Cotton Mill

BY BENN KERSHAW.

(In the first article of this series which appeared in the September number, it was pointed out that in finding costs in a cotton mill it is necessary to divide the various operations in each department into units, each unit to include only the machines which perform similar operations and through which the stock passes in practically the same manner. A cloth mill of 67,000 spindles was selected as an example and a unit table made up showing how this mill was divided. Then, under sub-headings, came the details of the card room. These covered the pickers, cards, combers, drawing frames, and roving frames, thus leading up to the spinning room. The second article, in the October number, continued these details through the spinning room, including spooling, twisting, warping, slashing and drawing-in. In the November number came the third article of this series which carried the cost calculations through the weave room, separating these into each plain or fancy style as made, and thence on through the cloth room, under which head came a general summary of labor costs. Any new subscribers for COTTON who may wish to secure the preceding articles in order to keep the series complete, will have their requests granted as long as copies are available.—Editor.)

Overhead Costs.

Having distributed the costs that may be properly classed as coming under the head of labor, there now remains those costs that are continually going on in all manufacturing plants, although they may not be as tangible as the labor costs are. The costs coming under this heading are termed mill overhead and include such items as taxes, insurance, interest, depreciation, etc.

When making a correct distribution of these costs, the first object is to subdivide them in such a manner that each particular unit of the mill will bear its correct proportion. As a guide to the making of this distribution, three main divisions of the mill will be made, as follows: buildings, land, and machinery. Coming under each of these divisions are the different units into which the plant has been previously divided. This is shown for the first item, which is that of buildings, as follows:

BUILDINGS:

Taxes	101.22	Repairs	38.46
Insurance	4.03	Depreciation	140.90
Interest	388.57		

The total amount to be distributed is 673.18. Following will be found the various items which come under this division, the cost, percentage of cost, and distribution.

The overhead consists of taxes 101.22, insurance 4.03, interest 388.57, repairs 38.46, and depreciation 140.90, making in all a total of 673.18, to be distributed under this heading. The interest shown here is the interest on the investment in the buildings and is not interest paid out on money borrowed. The depreciation of the buildings is figured at 2½ per cent. The propriety of including these charges at this time will be discussed later, the foregoing being all the explanation necessary here. Repairs includes only those general repairs to the buildings that cannot be directly attached to some single unit.

BUILDING DISTRIBUTION TABLE.

Unit	Cost	Percentage of Distribution	Distribution
Office	10,000.00	3.00	20.19
Shop	2,533.30	.76	5.12
Picking	5,156.41	1.55	10.43
Carding	10,607.52	3.19	21.47
Combing	7,387.24	2.21	14.88
Drawing	2,281.44	.68	4.58
Slubbing	1,568.00	.47	3.16
1st. Intermediate	2,058.00	.62	4.17
2nd Intermediate	4,198.32	1.26	8.48
Jack Frames	16,816.80	5.05	34.00
Warp Spinning	37,436.00	11.24	75.67
Filling Spinning	33,908.00	10.20	68.66
Spooling	5,096.00	1.53	10.30
Twisting	6,209.28	1.86	12.52
Warping	5,268.48	1.58	10.64
Slashing	4,074.84	1.22	8.21
Drawing-In	2,625.40	.79	5.32
Plain Weaving	84,272.50	25.30	170.31
Fancy Weaving	60,489.00	18.16	122.25
Cloth Room	3,528.00	1.06	7.14
Storage	8,640.00	2.59	17.44
Power	189,200.00	5.68	38.24
Total	333,075.53	100.00	673.18

It becomes necessary now to distribute the total charge 673.18, on some good equitable basis, to the various units, and the cost basis is considered the best in this particular case. The first column shown in the accompanying "Building Distribution Table" consists of the various units into which the mill has been divided; the second column shows the unit cost of each building; the third column shows the percentage of each cost to the total cost. The fourth and last column gives the portion of overhead to be charged to each individual unit, this being found by obtaining each unit's percentage of the total distribution. Take for instance the office, the cost of the building is $10,000, this being three per cent of the total; then three per cent of $673.18 or $20.19 is the portion of the overhead on all buildings which is chargeable to the office alone.

The distribution on land is next in order and is shown here under the heading of "Land." Under this heading will be grouped all charges not yet distributed, on which the cost is in direct proportion to the number of square feet occupied by each unit. The taxes here included are the taxes on the land only, the interest being interest on money invested in the land. The total charge as shown, or 129.61, is distributed on the basis of floor space occupied by each unit. The calculations being dealt with in exactly the same manner as described when dealing with the overhead on buildings.

LAND.

Taxes .....12.70 Heating and
Interest .....35.00 Humidifying 23.81
Lighting .....48.10 Watchman 10.00
The total amount to be distributed is 129.61, the actual distribution being shown in the accompanying Land Distribution Table.

LAND DISTRIBUTION TABLE.

Unit	Floor Space	Percentage of Floor Space	Distribution
Office	5,000	1.78	2.31
Shop	2,585	.92	1.19
Picking	5,198	1.85	2.40
Carding	10,824	3.85	4.99
Combing	7,538	2.69	3.49
Drawing	2,328	.83	1.07
Slubbing	1,600	.57	.74
1st. Intermediate	2,100	.75	.97
2nd. Intermediate	4,284	1.52	1.97
Jacks	17,160	6.10	7.91
Warp Spinning	38,200	13.58	17.60
Filling Spinning	34,600	12.30	15.94
Spooling	5,200	1.85	2.40
Twisting	6,336	2.25	2.92
Warping	5,376	1.91	2.47
Slashing	4,158	1.48	1.92
Drawing-In	2,680	.95	1.23
Plain Weaving	51,860	18.44	23.90
Fancy Weaving	37,224	13.24	17.16
Cloth Room	3,600	1.28	1.66
Storage	24,000	8.50	11.02
Power	9,460	3.36	4.35
Total	281,311	100.00	129.61

The next problem is the distribution of the machinery, which is shown in the table headed "Machinery Distribution Table." Before the table is given, a little explanation of the items contained therein is considered advisable.

The separate amounts consist of the following items: taxes on machinery, 269.58; insurance on machinery, 10.75; interest on money invested in machinery, 949.76; as well as depreciation on machinery, estimated at four per cent and amounting to 626.22; making a total of 1,856.31 to be distributed between the different units. The cost basis method is used in making the distribution.

The first column in the table shows the various units, while the second column is made up of the cost of the machinery in each separate unit; the third column giving the percentage that the cost of each unit bears to the cost of all machinery. The last column gives that part of the overhead chargeable to each unit, this figure being obtained in the same manner as described in connection with the overhead on buildings.

MACHINERY.

Taxes .....269.58 Interest 949.76
Insurance ..... 10.75 Depreciation 626.22
Total amount to be distributed, 1,856.31.

MACHINERY DISTRIBUTION TABLE.

Unit	Value	Percentage of Distribution	Distribution
Shop	5,000.00	.62	11.51
Picking	12,371.75	1.24	23.02
Carding	56,580.27	6.96	129.20
Combing	49,060.00	6.04	112.12
Drawing	7,288.50	.90	16.71
Slubbing	5,111.52	.63	11.69
1st. Intermediate	9,509.72	1.17	21.72
2nd. Intermediate	31,211.52	3.84	71.28
Jack Frames	86,088.74	10.59	196.58
Warp Spinning	108,845.96	13.51	250.79
Filling Spinning	98,847.00	12.16	225.73
Spooling	4,923.00	.61	11.32
Twisting	17,820.00	2.19	40.65
Warping	6,090.20	.75	13.92
Slashing	4,870.00	.60	11.14
Drawing-In	396.87	.05	.93
Plain Weaving	20,245.68	14.79	274.55
Fancy Weaving	91,406.80	11.24	208.65
Cloth Room	4,190.00	.52	9.65
Power	94,228.00	11.59	215.15
Total	814,085.53	100.00	1856.31

Although it cannot be strictly considered a part of the mill overhead, yet it is capable of being included with it and of being attached to the separate units—that is, the list of other expenses that come under the heading of power, repair shop, and supplies.

The various units of the mill have been sub-divided so as to contain both productive and non-productive units, the non-productive units embracing such items as the office, storage and power. It must be considered one of the main objects to so arrange the non-productive units that they will be attached to the productive units in a correct manner. Such costs as power and shop costs readily fit into this kind of an arrangement and will be treated in this manner.

Office as well as storage will, however, be dealt with separately. The distribution is shown later under the head of "Power." The first item under this heading is an expense item of 38.24 and is the overhead expense on the power plant buildings, this being taken from the table previously shown, headed "Building Distribution Table," it being the last item opposite "Power" in the distribution column. The charges shown for land of 4.35 and for machinery of 215.15 are also taken from their respective tables, the object being to include them with the other expenses of power and then distribute them to the productive units.

The fourth item, or the power expense of 86.00, is the

cost of insurance and depreciation, over and above the amount already charged to these two items under overhead, it having to be considered that the equipment of the power plant depreciates much more rapidly than that of the manufacturing units, also there is the additional amount of insurance for the boilers, which must be taken into consideration.

The next item of coal and labor covers the cost of the fuel and help in the power plant. Repairs and supplies, an item of 40.00, being taken from the repair sheet, which will be explained later. The total amount to be distributed is 957.64, the distribution being made on the horse power basis. The various units are again set down and opposite each unit is placed the horse power which will be required to drive the machinery which it contains. The third column in the power distribution table contains the percentage which the horse power of each unit bears to the total horse power. In the fourth column under the head of distribution is placed the portion of overhead cost to be charged to each unit. This method is the same as the one used under the heading of buildings, land, and machinery.

POWER.

Overhead from Building	38.24
Overhead from Land	4.35
Overhead from Machinery	215.15
Additional Insurance and Depreciation	86.00
Coal and Labor	573.90
Repairs and Supplies	40.00
Total Amount to be distributed	957.64

POWER DISTRIBUTION TABLE.

Unit.	Horse Power.	Percentage of Distribution.	Distribution.
Shop	10	.43	4.12
Picking	80	3.41	32.66
Carding	98	4.17	39.93
Combing	32	1.36	13.02
Drawing	15	.64	6.13
Slubbing	10	.43	4.12
1st Intermediate	15	.64	6.13
2nd Intermediate	50	2.13	20.40
Jack Frames	180	7.66	73.35
Warp Spinning	740	31.50	301.65
Filling Spinning	520	22.12	211.83
Spooling	8	.34	3.26
Twisting	90	3.83	36.68
Warping	5	.21	2.01
Slashing	6	.25	2.39
Plain Weaving	250	10.65	101.99
Fancy Weaving	230	9.80	93.85
Cloth Room	10	.43	4.12
Total	2349	100.00	957.64

The cost distribution in the costs of the repair shop is the next in order, this being shown in the table under this heading. The overhead of this division consists of 5.12, this amount being taken from the overhead on buildings; 1.19, taken from the overhead on land; 11.51, taken from the machinery overhead; and 4.12 from the power table, making a total of 21.94. To be added to this amount there are the labor and repair shop materials. It is assumed in this connection that a record of each repair job, together with the time and material used on this job, is kept, this being charged up to its proper unit.

The second column under "Repair Shop Distribution Table" shows the amounts expended for labor, for each unit when making repairs; the third column is for the materials used for repairs, while in the fourth column is shown the distribution of overhead for the repair shop. The distributions shown in this column are on the percentage basis, being obtained from the amounts paid for labor; that is, the items shown in the overhead column bear the same ratio to the total for overhead that the items in the labor column bear to the total for labor. It will be observed that there is no charge for overhead against power. Since there is a charge for power against the repair shop and also a charge for power used in the repair shop, against the power plant, one of these charges must be either estimated or omitted, before making up the charge for the other. In the present case the power plant charge has been omitted.

In this sheet is also included the cost of supplies, it again being assumed that an accurate record is kept of all outgoing supplies, the proper charge being made for these against each unit. The power charges of 9.00 for labor, 15.00 for material, and 16.00 for supplies, making a total of 40.00, have been carried forward to the power table and distributed there.

REPAIR SHOP.

Overhead from building	5.12
Overhead from land	1.19
Overhead from machinery	11.51
Power	4.12
Total of overhead charges	21.94

REPAIR SHOP DISTRIBUTION TABLE.

Unit.	Labor.	Material.	Overhead Charges.	Supplies
Office	....	....	....	20.00
Picking	1.20	4.52	.17	4.14
Carding	2.70	9.40	.39	8.62
Combing	4.80	16.66	.70	15.21
Drawing	1.50	5.24	.22	4.80
Slubbing	1.20	4.86	.17	4.51
1st Intermediate	1.80	6.60	.27	6.13
2nd Intermediate	4.20	14.27	.60	13.25
Jack Frames	9.90	33.85	1.44	31.43
Warp Spinning	7.20	24.20	1.05	22.18
Filling Spinning	8.40	28.22	1.22	25.87
Spooling	4.20	14.08	.60	12.97
Twisting	3.80	12.60	.55	14.00
Warping	2.10	7.85	.31	7.19
Slashing	1.50	5.30	.22	164.00
Plain Weaving	28.10	97.20	4.08	89.10
Fancy Weaving	61.50	205.92	8.94	188.76
Cloth Room	6.90	23.05	1.01	69.95
Power	9.00	15.00	....	16.00
Total	160.00	528.82	21.94	717.79

The various items on the several distribution sheets can at this time be totaled for each production unit, leaving out the power and repair departments, as these have been dealt with in the productive units. The charges to office and storage will be dealt with later.

The summary of the overhead charges has been completed in the accompanying table of "Summary of Overhead Charges," under their several headings. In this table the productive units only are shown and against each unit are placed the amounts distributed to it in the previous tables. Taking as an example of this the picking, reading across the table under the column marked "Buildings," there

is found a charge against this unit of 10.43, this being the amount charged against picking in the table on building overhead distribution. Under the next heading, "Land," is shown against picking a charge of 2.40 from the land distribution table, while under the heading of machinery will be seen an item of 23.02, this being taken from the machinery distribution table previously shown; under the heading of power is found the amount 32.66 from the power distribution table, while under their respective headings are shown the amounts of 5.89 and 4.14 respectively for repairs and supplies, taken from the repair distribution table, the 5.89 including 1.20 for labor, 4.52 for material and .17 for overhead, while the 4.14 is for supplies only.

The total of the separate amounts as here given is 78.54, this amount being placed under the column marked "Total." In this connection it must be understood that in actual practice the previous distributions shown would not be made in such detailed form, as all the distributions could be combined in one sheet or table and the totals carried out. It will thus be seen that the method here shown has been for explanatory purposes solely. All the overhead expense, as well as the power expense, repairs and supplies, have been distributed to the various units, and it now remains to get the total amount on each unit between the different stocks or different styles passing through that particular unit.

SUMMARY TABLE OF OVERHEAD COSTS.

Unit.	Buildings.	Land.	Machinery.	Power.	Repairs.	Supplies.	Totals.
Picking	10.43	2.40	23.02	32.66	5.89	4.14	78.54
Carding	21.47	4.99	129.20	39.93	12.49	8.62	216.70
Combing	14.88	3.49	112.12	13.02	22.16	15.21	180.88
Drawing	4.58	1.07	16.71	6.13	6.96	4.80	40.25
Slubbing	3.16	.74	11.69	4.12	6.23	4.51	30.45
1st Intermediate	4.17	.97	21.72	6.13	8.67	6.13	47.79
2nd Intermediate	8.48	1.97	71.28	20.40	19.07	13.25	134.45
Jack Frames	34.00	7.91	196.58	73.35	45.19	31.43	388.46
Warp Spinning	75.67	17.60	250.79	301.65	82.45	22.18	700.34
Filling Spinning	68.66	15.94	225.73	211.83	37.84	25.87	585.87
Spooling	10.30	2.40	11.32	3.26	18.88	12.97	59.13
Twisting	12.52	2.92	40.65	36.68	16.95	14.00	123.72
Warping	10.64	2.47	13.92	2.01	10.26	7.19	46.49
Slashing	8.21	1.92	11.14	2.39	7.02	164.00	194.68
Drawing-In	5.32	1.23	.93	..	..	..	7.48
Plain Weaving	170.31	23.90	274.55	101.99	129.38	89.10	789.23
Fancy Weaving	122.25	17.16	208.65	93.85	276.36	188.76	907.03
Cloth Room	7.14	1.66	9.65	4.12	30.96	69.63	123.16

In the case of each separate unit some equitable method of basing the distribution must be obtained, it being clearly apparent that the same basis will not serve in all cases. Entering into this, however, there is one element which is very important in the distribution, and this is the element of time, it being obvious that if it should take twice as long for a pound of one kind of stock to pass through the same unit, then the overhead charges on the first must be just twice the amount of those on the second.

As it is only possible in a few cases to know the exact amount of time devoted to each class of work, this is not always a feasible method, but most always there is some data available that is in itself so closely related to the element of time that it will serve all purposes just as well.

For instance, take a piece of work on the roving frame unit; this work can be turned out in a given time, and the price very accurately based on the time consumed. Therefore the amounts being paid on these machines for piece work being known, they can be used when distributing the overhead, with practically the same accuracy as if the amount of time spent on each hank roving was known.

Again, taking the case of weaving, if the number of looms on each style and the pounds of goods being turned out are known, by using these items in distributing the overhead, it is practically the same as if the element of time were being used, because the time which it takes to weave a pound of cloth of a certain style regulates the number of looms necessary to give the required production.

Therefore, although the actual number of hours consumed in turning out a certain production may not be used when making the overhead distribution at the various units, yet the element of time is the determining factor. Therefore, in selecting a method of distribution for any particular unit, it should be the aim to select a method suitable to this requirement.

Card Room Overhead.

The total sum to be distributed for picking is 78.54. If all stock were run through the pickers at one rate, and were treated in exactly the same manner on the card, then it would be correct to say that the total overhead cost on pickers, when divided by the final pounds turned out in the card room, would give the cost per pound of picking overhead on all stocks. But if the different stocks do not pass through the pickers at the same rate, which is the case in this mill under consideration, then it is not strictly accurate to use this method. There is also some of the stock carded, while some is combed, the combed work losing a lot more in waste than the carded; thus to make the statement that the final pounds produced in the card room show the relative amount of each stock passing through the picker is not correct. However, this point will be dealt with later and more fully under raw stock.

The vital question is, would the difference in the cost per pound warrant the extra amount of labor of taking these points into consideration? The answer to this question must at all times be governed by circumstances.

In dealing with the pickers, cards, combers and drawing frames, in each case the overhead cost has been divided by the total pounds produced, not taking into consideration the difference due to variations in production and waste on the various stocks. In the accompanying table is shown the cost per pound, the items under the column marked "Costs" being obtained from the total column of the table marked "Summary of Overhead Charges," while under "Pounds Produced' are the items from the card room production report.

PICKERS, CARDS, COMBERS AND DRAWING FRAMES.

Units.	Costs.	Pounds Produced.	Cost per Pound.
Picking	78.54	274.89	.002857
Carding	216.70	274.89	.007883
Combing	180.88	202.90	.008914
Drawing	40.25	274.89	.001464

SLUBBERS.

30.45 (overhead costs) ÷ 46.42 (piece work costs) = .6559 or 65.59%

Hank.	Piece Work Cost Per pound	Per Cent to Be Used	Overhead Cost Per Lb.
.60	.001664	65.59	.001091
.70	.001957	65.59	.001283

FIRST INTERMEDIATES.

47.79 (overhead costs) ÷ 60.44 (piece work costs) = .7907 or 79.07%

Hank.	Piece Work Cost Per pound	Per Cent to Be Used	Overhead Cost Per Lb.
1.04	.001177	79.07	.000930
1.35	.002060	79.07	.001628
1.65	.002632	79.07	.002081
2.00	.003176	79.07	.002511

SUMMARY OF OVERHEAD COSTS IN CARD ROOM.

Unit.	8 Hk.	10 Hk.	10 Hk.	12 Hk.	14 Hk.	16 Hk.	18 Hk.	20 Hk.	25 Hk.
Picking	.002857	.002857	.002857	.002857	.002857	.002857	.002857	.002857	.002857
Carding	.007883	.007883	.007883	.007883	.007883	.007883	.007883	.007883	.007883
Combing	.....	.....	.008914	.008914	.008914	.008914	.008914	.008914	.008914
Drawing	.001464	.001464	.001464	.001464	.001464	.001464	.001464	.001464	.001464
Slubbers	.001091	.001091	.001091	.001091	.001091	.001091	.001091	.001091	.001283
First Intermediate	.000930	.001628	.001628	.001628	.002081	.002081	.002081	.002081	.002511
Second Intermediate	.002836	.003903	.003903	.003903	.006535	.006924	.006924	.006924	.008917
Jack Frames	.007002	.009276	.009276	.011586	.014133	.021185	.021185	.027032	.035319
Totals	.024063	.028102	.037016	.039326	.045458	.052399	.052409	.058246	.069148

SECOND INTERMEDIATES.

134.45 (overhead costs) ÷ 161.68 (piece work costs) = .8315 or 83.15%

Hank.	Piece Work Cost Per pound	Per Cent to Be Used	Overhead Cost Per Lb.
2.6	.003411	83.15	.002836
3.5	.004695	83.15	.003903
4.95	.006460	83.15	.006535
5.25	.008328	83.15	.006924
6.6	.010724	83.15	.008917

JACK FRAMES.

388.46 (overhead costs) ÷ 514.86 (piece work costs) = .7544 or 75.44%

Hank.	Piece Work Cost Per pound	Per Cent to Be Used	Overhead Cost Per Lb.
8	.009282	75.44	.007002
10	.012296	75.44	.009276
12	.015358	75.44	.011586
14	.018735	75.44	.014133
16	.023682	75.44	.017865
18	.028083	75.44	.021185
20	.035833	75.44	.027032
25	.046818	75.44	.035319

The roving frame overhead is distributed to the different hanks being made, using the piece work cost basis. The slubbers, first intermediates, second intermediates, and jack frames are each put under a separate heading. In the case of the slubbers the total piece work cost is 46.42, while the total overhead is 30.45. By dividing 30.45 by 46.42 the percentage cost per pound of overhead on any hank run on the slubbers is shown in its percentage bearing to the cost per pound of piece work on that hank.

Thus the cost per pound of piece work for .60 hank is .001664, then 65.59 per cent or .001091 is the cost per pound of overhead on this hank. The method as shown here is the one employed in finding the cost per pound of overhead for each hank being made, as shown under their headings in the preceding tables.

Summary of Card Room Overhead.

At this time it is considered advisable to total the overhead cost per pound in the card room, for each separate hank in a table to be used for later reference, rather than treat each card room unit separately, but before giving this table, a little more information is considered advisable.

When totaling the card room overhead, due regard must be given to the organization of the room; that is, in attaching to any one hank made on the jack frame the overhead cost for the first intermediate, it is necessary to know which hank made on the first intermediate is going into the final hank roving being dealt with. This can easily be obtained from the organization sheet for the card room.

As a means of illustration we will take, for instance, the 8 hank roving, and following it through the various units as shown in the table of summary of overhead for the card room, the first item being a charge against picking. This amount is the same for each hank being made, therefore only one figure is necessary, namely .002857, this same fact holding true for carding and drawing.

As the 8 hank is not combed work, no charge is shown on combing, this space being left blank. Coming to the slubbers, two different hanks were run, .60 and .70 hank. Therefore in the later processes the particular one going into the 8 hank roving must be known, in order that the correct overhead charge can be made against the 8 hank. As the organization of the room is known, it is well understood that the overhead against the .60 hank on the slubbers is the one that goes under the 8 hank in the summary table. Also in the case of the first intermediates, it is the 1.04 hank that eventually goes into the 8 hank, therefore, the overhead of .000931 against the 8 hank must be placed in the 8 hank column against the first intermediate on the summary table.

In the case of the second intermediates, it is the 2.6 hank which goes into the 8 hank. The overhead for this on the second intermediate is .002836, and this amount is placed under the 8 hank opposite the second intermediate on the summary sheet.

[This is the fourth of a series of articles on mill cost keeping by Mr. Kershaw. Others will follow in early issues.]

A New Cotton Goods Commission House.

A new cotton goods commission house has been formed in New York, with offices at 57 Worth street. This new firm has a capital stock of $2,000,000, and will be backed financially by Neuss, Hesslein & Company, Inc., one of the largest cotton goods export houses in New York. The new firm will be known as Hesslein & Company, Inc., and is to do a strictly commission business, handling southern mill accounts. Arrangements have already been made with a number of southern mills to represent them in the market, and an additional number of mills will be announced later.

Mills doing business with Hesslein & Company, Inc., will have a very large outlet for their goods export through Neuss, Hesslein & Company, Inc., who will act as export agents for Hesslein & Company, Inc.

The officers of the new company are as follows: President, Frank L. Walton; vice-president, J. A. Rountree; second vice-president, K. M. Hess; treasurer, E. M. Martens; assistant treasurer, J. A. Staudt, and secretary, W. H. McLaren. The new company began business on December 1st.

The new firm of Hesslein & Company, Inc., have also been appointed the sole selling agent for John H. Meyer & Company, Inc., for their well-known line of khaki cloths.

Energy accomplishes nothing until it is harnessed.

Humidity in Cotton Mills

BY J. WILKINSON.

A humid atmosphere is absolutely essential for the successful spinning and weaving of cotton yarns and cloth. Cotton contains a certain amount of natural moisture, and while any addition to this moisture increases its strength and pliability slightly, a reduction decreases the strength and pliability very greatly, as the following tables will show:

Percentage of Moisture	Breaking Strength In Ounces	Length of Stretch Inches	Loss of Strength	Loss of Stretch
	UNSIZED COTTON YARN—34.7s.			
6.48	6.435	1.087		
4.41	5.000	0.772	22.3 p. c.	28.8 p. c.
2.39	4.775	0.681	25.8 p. c.	37.4 p. c.
0.45	4.780	0.650	25.7 p. c.	40.2 p. c.
Dry	4.215	0.625	34.5 p. c.	42.5 p. c.
	SIZED YARN—16.5% SIZE—36s.			
10.18	7.223	0.65		
8.02	6.550	0.569	9.4 p. c.	12.6 p. c.
5.94	5.923	0.462	18.0 p. c.	28.8 p. c.
3.94	5.985	0.412	17.2 p. c.	36.6 p. c.
2.02	6.090	0.369	15.8 p. c.	43.1 p. c.
Dry	4.77	0.288	34.0 p. c.	55.7 p. c.

If cotton yarn be exposed to a dry atmosphere during the process of manufacturing, the air robs the cotton of its natural moisture with the result that weaving and spinning are made difficult on account of the breakages which take place.

The effect of climatic conditions upon the various processes in the textile industry, especially in the spinning and weaving, has long been known, and is well understood by all mill men. Every mill superintendent is familiar with the fact that the cool, moist days of spring and autumn enable him to produce a stronger yarn and an increased output. He also knows that the hot, dry weather of summer and the cold, dry weather in winter, without artificial means of mill conditioning, reduce the output both in quality and quantity, and that owing to this variability it is impracticable to speed the machinery up to the capacity to which they might be driven under ideal conditions. On this account a large majority of mill managers realize the necessity and importance of providing artificial humidity.

For the benefit of those mill men who have given this subject little thought, I will enumerate a few of the advantages that may be derived from the artificial maintenance of a proper precentage of humidity in the mill, be it a cotton, woolen, or silk mill.

First—The fibers are more pliable and elastic and lend themselves more readily to manipulation on the various operations.

Second—The weight of the fiber bears a direct relation to the humidity of the surrounding space.

Third—The generation of electricity by the machines and the fiber is largely eliminated.

Fourth—It reduces the amount of fly and waste very materially.

Fifth—The fibers grip each other firmly giving a more uniform yarn of greater strength and better set, the results of which greatly reduce the breaking of the ends, thereby increasing the production very materially.

Sixth—The adjustment of the looms can be better and more positive.

Seventh—The production of a cooler, purer and better atmosphere in the mill, conducive to better health and comfort for the operatives.

Eighth—It raises very materially the "ignition" point of the cotton fiber and is, in this way, a very decided protection from fire caused by sparks especially in the picker and carding rooms.

The question always arises, what percentage of humidity is the best to use? Departments vary greatly in different mills so that it is hardly possible for any hard and fast rules to be given. Among the various conditions which affect the relative humidity best suited for a certain condition may be mentioned the mode of operation, the number of the yarn, the character of the fiber, i. e., with long or short staple cotton, the amount of dirt or dust in it, the kind of building, and the amount and character of the size used in the dressing.

From the foregoing it will be seen that each mill superintendent should study the conditions of his own mill, and accurately determine the percentages best suited to his own needs. As a rule, the finer the yarn the higher the humidity desirable.

In the card room one of the principal objects to be attained is the prevention of electrical conditions. An excessive humidity here, is, however, quite as objectionable as one that is too dry.

In the spinning room the humidity suitable is largely dependent on the number of the yarn, the finer yarn needing the higher humidity. In the winding room it is desirable to have as high a percentage as possible. In the picker room a high percentage acts as a fire preventor by raising the ignition point of the fiber.

The presence of a good humidifying, heating and ventilating apparatus is an acknowledged necessity in all textile mills, where, by its introduction, the humidity of the air can be regulated so as to bear to its temperature a proper proportion. Other results which may be attained in addition to those already named, are the following: It reduces the quantity of floating fiber in the room, obviates the necessity of constantly changing the gears in slubbing, intermediate, and roving frames to keep the sliver uniform during weather changes. In mills spinning 40s to 50s the actual waste of cotton has been reduced in the carding and preparing rooms, so as to enable the same counts to be spun with five per cent less cotton. On account of the carding and preparation being carried on in a uniform heat and degree of humidity, the slivers produced by the roving frames are uniform in counts. The production of ring frames has been increased as much as 10 per cent, and the waste from 18,000 spindles reduced to 70 pounds per day. The yarn produced under favorable conditions has been found to be more regular in counts, to contain fewer kinks, to wind infinitely better and to have the fibers better laid, resulting in the breaking strength being much higher than

when the yarn has been spun without the proper humidifying conditions. The fact that a greater weight can be produced with less waste is due to the fact that the yarn is closer spun, there are fewer loose fibers.

In a good system of humidification combined with ventilation, no fans should be required, no steam used for humidification, no water running to waste, no working parts liable to get out of gear, even distribution of humidified air should be assured and carbonic acid reduced to a minimum, regulation should be by simple valves, and a large volume of air should be discharged at a small power consumption.

When such a system is employed in a spinning or a weave room, it is cooling in summer and heating in winter. So far as the former is concerned, in tests made in places where really good apparatus is in use, it has been found that the temperature inside the room has been reduced to several degrees less than the temperature outside. If the humidification of the air is effected in the warmer weather without the use of steam or other source of heat, the maximum cooling effect of evaporation and ventilation is secured. In humidification the cooling effect depends upon the amount of moisture which the air will absorb to saturation while the per cent of humidity after saturation depends entirely upon the temperature in the room.

The humidifying effect is directly dependent upon the cooling effect. If the temperature is allowed to rise a great excess of moisture is required for the humidifying and the process is therefore made more difficult. On the other hand, if the ventilation is ample to prevent a rise in temperature in the mill, very little moisture need be added to the air, and the proper humidity is easily attained.

The results of a good system in summer should be exactly what would be obtained in cool, foggy weather by blowing the outside air into the mill in sufficient quantity to keep the temperature within a certain degree of the outside air temperature. The amount of air which would have to be used to accomplish this would depend entirely upon the amount of heat liberated by the machinery, which could be easily determined. This cold moist air ventilation is the only method for effectually conditioning the mill in the hot dry weather of summer. It provides for a cooling effect which can be obtained in no other way, and by creating an air pressure within the building, it excludes the warm, dry air which tends to lower the humidity. The mill should be cooled without opening the windows. This permits the successful spinning of fine yarns in warm climates where it would otherwise be impossible, as the air is so introduced that it does not blow lint around the room, nor produce drafts near the floor. The diffusion should distribute the air perfectly at low velocities, and humidity and temperature conditions should be everywhere uniform.

When winter comes on, if the fan system is employed for heating purposes in connection with a good humidifier, it works successfully, as only sufficient air is taken from outside to create a plenum within the building, and to prevent the infiltration of cold, dry air, so that a maximum economy in heating is secured—an economy which is greater than that which can be secured by direct radiation. The air is uniformly humidified before entering into the room, not afterwards. Thus the humidifying works in conjunction with the heating system, and one does not antagonize the other. The circulation produced maintains a uniform degree of humidity in all parts of the room.

At the present writing the "plenum" principle of humidifying and ventilating cotton mills is the most popular among mill engineers abroad, and there are numerous reasons for this. In the first place the fresh air can be forced into the rooms from any definite position, this prevents any foul smelling air from getting in. In the second place the air can be filtered, and also "conditioned" before it enters the rooms. In the third place, the air is warmed before it enters the room, and there is no danger of cold air affecting the work or workers.

As regards humidity in weaving rooms, a dry atmosphere acts perhaps more unfavorably than elsewhere, the length and width of the cloth cannot be kept uniform except with difficulty; further than this, the cover and feel of the cloth are not what they should be and in colored weaving, brilliancy is lacking in the colors.

I might say here that the "plenum" system of humidifying and ventilating cotton mills means one by which fresh air is forced into and *fills* the building to be ventilated and drives out the vitiated air, in other words, it is the opposite to the vacuum or natural process by which the vitiated air is drawn out by a fan.

Humidity is of the first importance in a cotton mill and during recent years mill managers have been most particular in regard to humidifying installations, and have required something more than the mere moistening of the atmosphere of the mill. They have demanded that in addition there should be provided some means for ventilation, cooling of the mill and an automatic and positive regulation of both temperature and humidity. Ventilation is now regarded as an economical consideration, as well as a humanitarian one. Directly mills become filled with high speed machinery using a large amount of power with the resultant rise in temperature, artificial cooling becomes necessary.

Humidity and temperature are too closely allied for the one to be successfully treated without the other and with an atmosphere in cotton mills maintained uniformly at the point best suited to the operation at hand, few adjustments in the machinery are needed, and usually it can be operated at increased speeds.

Wherever the "plenum" principle of ventilation is employed it is essential that a "steaming" or "conditioning" apparatus should be attached to it. In many cases the plenum system has been adopted in mills already fitted with steam jets or other humidifiers, in these cases there is not the same necessity to humidify the air as it enters, but it would be better if it were done.

By the term "atmospheric humidity" is meant the quantity of water contained in the air in the form of vapor. The maximum amount of water which one cubic foot of air can hold depends upon its temperature, and where this limit is reached the air is said to be saturated.

The degree of humidity is stated as "relative" where the percentage of full saturation corresponding to the temperature is given; and "absolute" when the grains of moisture per cubic foot are specified.

Under normal conditions the external air has a relative humidity varying from 50 to 75 per cent of full saturation, and an absolute humidity depending upon external temperature. When the relative humidity is much below or above these limits, ill effects from a hygienic point of view are

(Continued on page 155)

What the Southern Mills are Doing

A continued activity in new construction and development has marked the reports of what the southern mills have been doing during the month just past. Announcements of considerable expansion work have been made recently, indicating on the surface a necessity for increased equipment for meeting a stronger demand. At this time also, much improvement work is to be noticed among southern mills that are changing equipment and making additions to and increases in various departments in the plant and in the mill village.

Among the most interesting news of the month is a definite announcement concerning the new bleachery in South Carolina. Following the beginning, some months ago, of an increased interest toward developing the finishing end of cotton manufacturing in the South, rumors have been current concerning a bleaching and finishing project for fine cotton goods which was said to be under contemplation by South Carolina mill interests. However, conflicting reports were made and denied, but recently definite announcement was made that this project will be launched.

The detailed report states that this plant will be located at Taylor, in Greenville County, S. C., on the Enoree River, and will be known as Southern Bleachery, Inc. The promoters have secured 200 acres of land with water rights, and will dye, bleach and finish fine cotton goods, being the first plant of this kind in this section. Production of 1,250,000 yards a week is planned. H. R. Stephenson, formerly connected with the Union Bleaching and Finishing Company of Greenville, and at present general manager and vice-president of the Lanett Bleachery & Dye Works, at West Point, Ga., is to be the manager of the new plant at Taylor, with his brother, R. G. Stephenson, Jr., as superintendent. H. R. Stephenson will retain his connection with the West Point company as vice-president, it is stated.

The capital of the new Southern Bleachery, Inc., is $1,000,000, which is owned by a group of southern and New England interests.

A committee of bankers, merchants, cotton dealers and capitalists, appointed by the president of the Fort Worth, Texas, Chamber of Commerce, at a recent meeting, decided upon the erection of a 20,000-spindle mill in Fort Worth to manufacture cotton goods. A sub-committee consisting of W. M. Massie, vice-president of the Fort Worth National Bank, and William Monnig, president of the Monnig Dry Goods Company, was named and instructed to confer with outside capitalists who have indicated a willingness to invest in a mill at Fort Worth. The action followed a lengthy investigation undertaken by the industrial department of the Chamber, which sent a representative to the Southern Textile Exposition at Greenville. The West Texas Chamber of Commerce also sent representatives to Greenville, and it is expected that movements for other cotton mills in West Texas will be started in the near future.

In addition to the weave room expansion recently announced, the Judson Mills, Greenville, S. C., will make an addition to the picker room of the mill, which, when completed, together with the other extensions, will practically double the present producing capacity of the mill. The total cost of the expansion work will approximate $700,000. The picker room addition will be two stories high with basement, and will have a floor measurement of 50x60 feet. The basement will have a 13-foot ceiling.

Coincident with this announcement is the statement of Judson officials that consideration is being given to increasing the capital stock of the organization from $1,200,000 to $2,500,000.

The Judson Mills have also contracted for a new community building to be built in the village at a cost of about $75,000. This building will be of brick construction, two stories high, and is to be used solely for the recreation of the operatives and their families. The basement is to be given over to a swimming pool, while the second floor will be used as an auditorium. The building will be 140 by 67 feet, and the swimming pool will measure 100 by 40 feet. The remainder of the lower floor not taken up by the swimming pool will be used as cooking rooms where domestic science classes may be taught and refreshments and banquets prepared. In connection with the community building, Judson Mills will construct a restaurant building to be used by their employees. This will be 40 by 100 feet, with steel sash and hollow tile wall construction.

An up to date water and filter system has been established by the Thomaston Cotton Mills at Thomaston, Ga. The settling basin covers three acres of land and the filter capacity is 1,500,000 gallons daily. The source of supply is from Potato Creek. It is further reported that this system will be used to furnish water to the Peerless Cotton Mills for a bleachery and finishing plant to be installed by them in the near future.

Fifty cottages, to cost approximately $50,000, will be completed shortly in the village of the Lowell-Kincaid Bleachery, at Griffin. The bleachery building is fast nearing completion, and will involve the expenditure of around a million dollars, it is stated.

Mills Mill, Greenville, S. C., have announced plans for the construction of a four-story extension to their plant, to be 100 by 50 feet, of brick construction, for the providing of 5,000 additional spindles to the manufacturing facilities of the organization.

Lockwood, Greene & Co. are engineers on an addition to be erected by the Alta Vista (Va.) Cotton Mills, which will be 130 by 125 feet, for the installation of 13,000 spindles and 300 looms. Another building, 100 by 125 feet, will also be erected, for power plant purposes.

The addition to be erected by the Patterson Mills Co., Roanoke Rapids, N. C., will be two stories high, 100 by 140 feet, standard mill construction with saw-tooth roof. It will house 256 Crompton & Knowles automatic looms when completed, which will manufacture ginghams, and changes in the dyeing and shipping departments of the plant are also planned.

The Lone Star Cotton Mills, San Antonio, Texas, have been leased by a syndicate of business men of Brenham, Texas, who will operate them under the name of The Adams Cotton Mfg. Co. of Brenham. The mill will be under the direct management of T. A. Adams, general manager of

the South Texas Cotton Mills at Brenham. W. H. Gibson, formerly at Denison, Texas, will be superintendent. Officers are J. H. Simon, president; D. C. Giddings, vice-president, and T. A. Adams, secretary-treasurer.

Goodson-Howard Cotton Mills, Helena, Arkansas, have been purchased by Arthur H. Lowe, of the Parkhill Mfg. Co., Fitchburg, Mass., for the Delta Land Co., which is owned by Mr. Lowe and his son, Russell B. Lowe. The Delta Land Co. plans to use the plant for manufacturing the cotton grown on the extensive plantations owned by the company at Melwood. The new owners, it is understood, will equip the mills, which now contain yarn machinery only, for the manufacture of ginghams. This will necessitate the installation of looms and dyeing equipment. In the meantime, production of yarn will be resumed so soon as the electrical equipment of the plant is overhauled.

The picker facilities of the American Spinning Company, at Greenville, S. C., will be enlarged. The addition for this purpose will be 100 by 30 feet, three stories high. The walls will be concrete and brick, and the floors concrete. The project will cost $15,000.

Lincoln Mills of Alabama, Huntsville, Ala., have purchased a tract of land consisting of about eight acres contiguous to its plant. No announcement of the plans of the company has been made, but it is reported extensive additions are contemplated.

Report from Lincolnton, N. C., states that the cotton mill known locally as The Black Ox Mill is being revived by a new company, to be known as the Excell Manufacturing Company, with C. E. Childs as president and general manager; J. R. Gamble, vice-president; V. M. Ramsay, secretary; W. H. Childs, treasurer, and Sherwood Childs, superintendent. The entire plant is being overhauled and new machinery installed. The plant has been idle for some time.

A new 1,000-loom textile plant will be built at Great Falls, S. C., the machinery having been bought, and construction work will be launched immediately. This will give Great Falls its third cotton mill. James B. Duke is greatly interested in the Republic Cotton Mills, and is said to be behind this new development.

Sapona Cotton Mills, Cedar Falls, N. C., are starting up the following new Whitin machinery: 15 cards, three flyer frames, 3,000 spindles, to make 30s hosiery yarn on cones.

Sand Springs Cotton Mill Corporation, Sand Springs, Okla., has been incorporated with a capital of $1,000,000. Harry Folk and E. M. Monsell, of Sand Springs, and Frank B. Long, of Tulsa, Okla., are among the incorporators.

Gambrill & Melville Mills Co., at Bessemer City, N. C., have purchased 101 90-inch Nordray automatic looms, for weaving wide sheetings, from the Hopedale Manufacturing Co. These looms will constitute an addition to the present weaving equipment, and will be equipped with Hyatt roller bearings on both the cam and crank shafts.

Columbia Manufacturing Company, Ramseur, N. C., have installed 132 40-inch Model E Draper looms for manufacturing four-yard sheetings.

Woodruff (S. C.) Cotton Mills recently let the contract for the construction of 25 new homes for operatives in the mill village.

Installation of machinery in the new addition now under construction at the Alexander Manufacturing Company, Forest City, N. C., will begin during the first part of 1923. This will consist of 21 cards and 5,280 spindles, which will give the mill a total of 15,840 spindles, making high grade carded knitting yarn 26s to 34s.

Several hundred automatic looms will be installed at the Oneida Mills (L Banks Holt Mfg Co.) Graham, N. C. It is reported this contract has been let to the Draper Corporation.

The Exposition Cotton Mills, Atlanta, Ga., are replacing 400 shuttle-changing looms with a like number of bobbin-changers, to be furnished by the Draper Corporation.

Consolidation of the Iceman Knitting Mill, the Icemorlee Cotton Mill and the Everett Cotton Mill, Monroe, N. C., into one corporation to be known as the Icemorlee Cotton Mill Company, has been announced. The initial capitalization of the concern is $1,000,000. In connection with this statement an interesting announcement is that Arthur J. Draper, of Charlotte, heads the consolidated interests as president of the new corporation. Charles Iceman and J. H. Lee are vice-presidents. Mr. Iceman will be general manager of the properties, and E. O. Fitzsimmons, of Charlotte, will be the treasurer. It is reported that the new organization will make extensive enlargements and improvements to the existing plants.

Maginnis Cotton Mills, New Orleans, La., have purchased 100 40-inch Nordray automatic looms from the Hopedale Manufacturing Co.

Social Circle (Ga.) Cotton Mill Company is installing five new spinning frames and one new speeder frame, to take care of the additional looms recently installed.

Work has begun on the laying out of a park at the Morowebb Cotton Mills Co., Gastonia, N. C., and the mill homes are being improved.

A weave shed extension is being considered by the Eno Cotton Mills, Hillsboro, N. C.

The Pickett Cotton Mills, High Point, N. C., are installing 12,000 spindles.

A syndicate headed by Dr. H. A. Ligon and H. A. Ligon, Jr., of Spartanburg, has purchased the W. S. Gray Cotton Mills, at Woodruff, S. C. The probability of the addition of a weave room to the present plant is reported.

Resumption of construction work on the Arkray Mills, Inc., and the Flint Mfg. Co., at Gastonia, N. C., by the Turner Construction Company, has been annouced.

The extension to be built by the Calhoun Mills, at Calhoun Falls, S. C., will include a one-story with basement weave shed addition and a one-story extension to the cloth room. Both additions will be 131 feet wide. A new 1,500 kw. power plant will be built, with steam turbine and direct connected generator.

Cannon Manufacturing Company, Kannapolis, N. C., has awarded contract for the erection of a new filtering plant and also for the erection of a number of operatives' houses.

Brown Mfg. Co., Concord, N. C., will erect 20 new operatives' homes, it is announced.

The Trade Extension Bureau, Opelousas, La., is developing plans for the construction and operation of a local cotton mill.

Beveridge, Jones & Co., of Atlanta, Ga., have purchased the Pocahontas and the Matoaca Cotton Mills, Petersburg, Va. They will equip the Matoaca mill for the manufac-

ture of cord tire fabrics and the Pocahontas mill for the production of other textile goods. Automatic looms and other equipment will be installed.

Plans are being developed for the establishment of a mill at Greenville, Miss., for the manufacture of cotton cordage. Herbert Stanley, secretary of the Chamber of Commerce, is in charge.

The Kerr Bleaching & Finishing Works, Concord, N. C., will erect a three-story warehouse, a new singeing room and will otherwise enlarge their properties.

Roberdel Mfg. Co., Mill No. 2, at Rockingham, N. C., is equipping the looms in their weave room with individual motor drive.

Star Thread Mills, at Athens, Ga., have started construction work on their plant to increase capacity. The Southern Manufacturing Co., also of this city, recently increased its capitalization to $2,000,000, for proposed expansion, it is reported.

It is understood that the A. M. Smyre Mfg. Co., at Ranlo, near Gastonia, N. C., will erect another manufacturing plant for fine yarns. This concern recently increased its capital to $500,000.

Work has commenced upon an additional dyehouse at the Southern Franklin Process Co., Greenville, S. C., which will double the capacity of the dyeing facilities of this concern.

Stonecutter Mills Co., Spindale, N. C., will add 275 looms to their plant.

A cloth inspection room for the Merrimack Manufacturing Co., Huntsville, Ala., will be built by the Baxter Brothers Construction Co., at a cost of approximately $20,000.

Individual drive will be applied to the looms of the Gibson Mfg. Co., Concord, N. C., and an additional 190 looms will be installed about the first of the year.

The Inman Mills, Inman, S. C., have awarded contract for the construction of 50 new houses for the employees of the mills.

The mill of the Selma (Ala.) Manufacturing Company will be electrified shortly, it is announced by J. F. Ames, proprietor.

An additional plant is considered by the Bonham Division of the Consolidated Textile Corporation, at Bonham, Texas. The present plant is now operating double time.

Callaway Mills, Inc., 345 Madison avenue, selling agents for the Callaway chain of mills, have become representatives of the Athens (Ga.) Mfg. Co., of Athens, Ga., thus adding tire fabrics to the varied line of mechanical cloths handled by them. The Athens mill produces high grade carded peeler cord fabric, as well as 18s to 32s single and two-ply weaving yarns. New tire fabric equipment has been installed at the Athens plant, including the latest devices to regulate tension in weaving from creels.

Chattanooga, Tenn., has a new industry—a silk manufacturing plant. The Magnolia Silk Mills have been organized by R. B. Davenport, E. E. Pickard, J. P. Hoskins and others for the purpose of manufacturing silk on cones for hosiery mill use. The plant is now established in temporary quarters, but it is understood a permanent building will be erected later.

The California Cordage Company, capitalized at $250,000, is building a spinning mill for the manufacture of yarn for insulation purposes, at Orange, California, 32 miles from Los Angeles. A. H. Danforth, who was interested in the development of the Imperial Cotton Mills Co., at Los Angeles, has been instrumental in the establishment of this organization and the California Wire Co., of which it is a subsidiary. The mill building of the yarn mill will be 80 by 150 feet, with exterior of tile and stucco. The equipment will begin with 2,500 spindles for making insulating yarns, wrapping and filling twines and cotton rope. Waste will be utilized from the Imperial Cotton Mills. Louis Koth is president, F. W. Struck is vice-president, Fred A. Grote, secretary-treasurer, and Fred H. Alden sales manager. L. S. Sossamon is superintendent.

The New England Mill Situation

Labor conditions are gradually getting better in New Hampshire, where the strikes of the year have been prolonged. The operatives in the mills at Suncook, N. H., voted to return to work on the 54-hour-week basis and on November 15 there were more than 10,000 looms in operation at the mills of the Amoskeag Company on the 54-hour-week basis.

An effort made by the Catholic bishop of Manchester to bring about a compromise between the strikers and the managers of the Amoskeag Company failed. Letters written by both parties were courteous in tone, but the company firmly refused to compromise on the matter of hours, having already eliminated wages from the cause of the troubles. As a reason for trying to bring about a compromise it was alleged that the strike involved a moral question in which the rights of workers were bound up. For the company it was stated that the moral obligation due to employees was recognized, but in the face of an economic necessity compelling the factory to meet the costs of production or go out of business, it remained for the operatives to decide whether they would accept work under the conditions the mills could afford to lay down.

A great deal of political and labor union force has been brought to bear upon the Amoskeag Company to make it recede from its position of exercising a right to operate a plant within the legal hours provided for in the state laws. The labor unions now hope to bring the whole question to the attention of the New Hampshire legislature in the form of a petition or bill for a 48-hour law. If such a law is passed the company will abide by it, of course, but it is by no means settled that the election results in the state mean the enactment of a short hour law in New Hampshire. The Republicans are in control, and while that does not imply that the mills will be favored in this instance, it is fully expected that no further handicaps will be imposed on this large plant.

The Amoskeag Company is one of the few large ones in New England that has not sought to locate plants elsewhere to avoid the effects of restrictive laws. In addition, it is one of the plants in New England that has always been foremost in adopting mill improvements. Its equipment is not only modern, but it is efficient to an extent that permits production on a competitive basis with mills outside of New Hampshire if hours of work and some other conditions are equal. In standing so firm for its right to operate its plant under state laws, the company has a larger measure of sympathy than it appeared to have a month or two ago.

One of the astonishing things of the recent political

campaign in Massachusetts was a union of effort on the part of several cotton manufacturers and several union leaders to win votes for Senator Lodge on the ground that he had promised to introduce an eight-hour bill in Congress patterned on the Massachusetts law. Senator Lodge won the election by a close margin, but his promise to introduce a national eight-hour bill in Congress is not expected to have much effect in enacting such a law. For one thing, there are several states not in the South that already resent the constant threat to pass national legislation that may well be of state importance.

The handicap under which Massachusetts mills are working through the enactment of a 48-hour law is already so great that Massachusetts capital seeking investment in state industries is growing patently less. Mills located outside of the state, and represented at Boston through treasurerships or commission houses, are already drawing more investment and re-investment than mills in the state. One large mill stock broker stated a short time ago that he is in receipt of many inquiries for stocks in certain Maine and Connecticut mills and he traces some of them to the advantage of location arising from the lack of legislative restrictions imposed in Massachusetts.

Trade has continued very good during the past month and the mills in this section are comfortably sold ahead, many contracts carrying well into next year. The recovery in the fine goods business has been especially noteworthy. The demand for yarns has been better than at any time in nearly two years. There have been steady sales of lawns, voiles, pongees, canton silks and cottons, oxfords, and other staples or semi-staples and there have been some increases in reorders of fancy goods for spring. To maintain deliveries some mills are running various departments at night, this practice being more readily possible now because of the wide distribution of electrical equipment.

The volume of business placed on sateens in the past two or three months is stated to have been larger than at any time since immediately after the armistice. The price advance on some of these numbers has been very sharp. Drills and jeans have sold very well and more business has been done on twills for linings than for more than two years. The recovery in trade in sheets, pillow cases, and wide sheetings, has been very marked and the largest mills working on those lines now have ample orders in hand to keep them engaged for three months. During the past month the demand for spot deliveries of napped cottons has led to sharp advances. It is inevitable that there will be a scarcity of these lines owing to the prolonged curtailment in mills like the Nashua, Amoskeag and other large producers.

Fall River has sold very freely in the past six weeks, most of the business being done on 36-inch or other narrow thin goods. The orders placed on regular wide print cloths were not important, most of that sort of business being unattractive at New York prices. The scarcity of narrow looms has been leading to a premium in poundage price on some of the wanted narrow fabrics for printing and converting. Fall River has sold sateens and twills very freely.

The job printers have not been as active as bleachers, dyers, or specialists in piece dyeing. The last reports of the finishers' association showed that while bleachers and dyers were engaged to more than 80 per cent capacity, the printers were employed only to 60 per cent capacity. These figures do not include the operations of the large corporation plants like the Pacific, American, Arnold, or Windsor. All of those named are running in full. Percales, cretonnes, draperies, and wash goods for spring comprise the bulk of the product being turned out. Percales are still unpriced for contract delivery, the larger printers having withdrawn prices after sales made at 12½ cents took care of this year's possible output. Some stock goods have been sold in a very limited way at 13½ cents.

Bleached cottons have improved somewhat in demand but prices are still under current costs of replacement. The large bleacheries could easily handle a fifth more work than some of them have in hand. The business in ginghams has continued steady yet the reports show upon analysis that orders are not as large as they were a year ago. Prices are firm enough yet the distribution has not been so active that the loss of the Amoskeag product for ten months is any source of complaint.

There has been a distinct revival in the demand for the many automobile products made in this section, notably special wide fabrics, tire fabrics, and some of the webbings. The revival noted some time ago in corduroys has been very well maintained and there has been a good business done in many lines of cotton pile fabric mills would make. It has been distinctly a velvet season and the imitations in cottons have sold well.

Improvement of a positive character has occurred in many of the knit goods mills. Staple hosiery has shown activity while many of the spring lines of fine knit underwear have sold up within the past six weeks after long delays on the part of buyers.

The mill machinery business has been good. There are not many new projects contemplated in the New England field in cotton lines, and the great bulk of the business in hand and in sight comes from the South. Wherever business comes to the surface in New England it is usually in the nature of repairs or minor additions, while much of the recent work booked from the South entails complete equipment so far as it can be supplied by individual plants.

The cotton outlook is looked upon by manufacturers as most serious for the months beginning in April and continuing till a new crop begins to come to hand. Just at present, considerable difficulty is found in getting spot cotton moved, due to the troubles of transportation, but not of supply. Later on, the question of supply is expected to become very grave. The volume of cloth and yarn business has been so satisfactory of late that manufacturers have not been conspicious in their complaints of the price of the staple.

But many manufacturers and not a few merchants apprehend trouble that will arise from the low purchasing power existing in many farming communities and in foreign countries. The question of price for later delivery has entered into cloth sales very strikingly in the past few days, some selling agents for the larger mills having concluded that higher prices must be named, even if they are not paid in the near future.

Many jobbers and retailers have been selling cotton goods at prices having no proper relation to the high price of cotton due to actual shortage in the yield. If this is kept up the time will come when a decided congestion in the movement of goods will be felt. This leads agents to

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Looking Backwards to See Ahead

IF you look backward far enough, you can see into the future. History, in other words, repeats itself. The company which has brought forth only *reliable* devices can be counted on for reliable improvements.

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say that if jobbers propose to sell out their stocks at losses that is not a reason why mills should go on accepting business to keep them busy and then to find that unsold stocks must be sacrificed. It may happen, as it has so often happened before, that both the fears of manufacturers and merchants may be ill founded as to the power of desire of people to pay for cotton goods once they know that it arises from real scarcity.

Meetings for N. E. Operating Executives.

The Bradford Durfee Textile School, of Fall River, in conjunction with the Associated Industries of Massachusetts, has begun a series of meetings to be held during the winter in the school hall for the benefit of the mill overseers of Fall River.

The idea back of these meetings is that which has made so successful the departmental discussion meetings held in the South by the Southern Textile Association—that men having similar interests can accomplish a great deal of good for all by meeting in this way and exchanging ideas. A speaker is arranged for each meeting, and his talk is to be followed by a period of discussion in which each man present will be free to take part. The mills of the city have been canvassed for the purpose of obtaining the interest of the mill financial executives, and they are practically a unit in supporting the movement, says Henry W. Nichols, principal of Bradford Durfee.

The first of these meetings was held on Tuesday evening, November 14, when Frank F. Morris, safety engineer for the Liberty Mutual Insurance Co., Boston, spoke on the question "How can we cut down the number of accidents in our mills?"

December 5 was the date set for the second meeting, with Ralph E. Loper, industrial engineer of Fall River, discussing the question "How large a part does waste play in a mill's making or losing money?"

The remaining meetings of the series are scheduled about a month apart, the third meeting being planned for Tuesday evening, January 9, 1923, at 7:30 o'clock, when the discussion will be started by J. A. Parks, of the Industrial Accident Board, Boston, who will discuss the question, "What are we trying to do by means of our labor laws?"

Humidity and its effect in making the work run better will be taken up at the fourth meeting, to be held at 7:30 o'clock on the evening of February 6, when Thayer Francis, engineer of the Parks-Cramer Company, Fitchburg, will discuss this important subject.

"What can we do to promote good will among our operatives?" is the subject of the speaker at the fifth meeting, which will be at 7:30 o'clock on the evening of March 6. A. Stanley Llewellyn, service manager of the Lancaster Mills, Clinton, will be the speaker.

The sixth and final meeting of this series will be held on Tuesday evening, April 3, at 7:30 o'clock, and Henry W. Nichols, principal of the Bradford Durfee Textile School, Fall River, will discuss the question, "What can we do to make our job a better job?"

A pessimist is a chump who thinks everything is wrong. An optimist is a chap who knows everything is wrong and doesn't care a hang.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, November 18th, 1922.

Having come to a full realization of the shortness of this year's crop commensurate with world requirements, trade buying was much in evidence during the past month, raw cotton and cotton goods having been bought freely, resulting in an important advance of about four cents per pound or $20 per bale.

At the moment, however, the demand is not so keen, the higher prices restricting business, we should say trading, as returns indicate business to be increasing, with prospects of expanding further in the future, a big holiday trade being anticipated in all sections of the country.

In the meantime there is no weakening on the part of southern spot owners, for while buyers and sellers are virtually apart at the moment, planters hold the edge on the situation since they have marketed the bulk of the crop at a satisfactory price and are financially able to hold the remnant of the crop for a higher price, whereas spinners are under contract and must of necessity have the cotton if they expect to keep their machinery in motion.

The Census Bureau reports that American mills consumed 596,000 bales during October, against 560,000 last year, of which 62,000 bales were linters against 66,000 one year ago, making the total for the first three months of the season 1,740,000 bales, compared with 1,628,000 last season, of which 183,000 bales were linters, against 182,000 last year.

In view of the fact that American mills consumed 6,234,000 bales of American cotton last season, and the consumption for the first quarter of this season is 112,000 bales larger than one year ago, it follows that domestic mills will likely need at least 6,500,000 bales this season.

Europe will need 6,000,000 bales of American cotton, but owing to the shortage of supplies this season, we doubt if they will be able to obtain more than 5,000,000, as the Suoth has made provisions for only abuot 11,876,000 bales to supply world requirements of over 12,000,000 bales; in fact, the world's consumption of American last season was 12,804,000 bales.

To give an idea of the present and prospective strong statistical position of the staple, we would call your attention to the following interesting deductions, which represents the status of the cotton situation:

Exclusive of mill stocks—	This season.	Last season.
Carried-over in the interior, July 31.	1,276,000	4,690,000
Crop, including linters, estimated...	10,600,000	8,376,000
Total supply for season.....	11,876,000	13,066,000
Marketed to date	5,576,000	4,887,000
Remaining to be marketed Nov. 17	6,300,000	8,179,000
World's visible supply of Am. to-day	3,603,000	4,423,000
Total world's available Nov. 17..	9,903,000	12,602,000

The strong features of the above statement are indications, notwithstanding this year's crop to be about 2,000,000 bales larger than last year's yield, that the South now has

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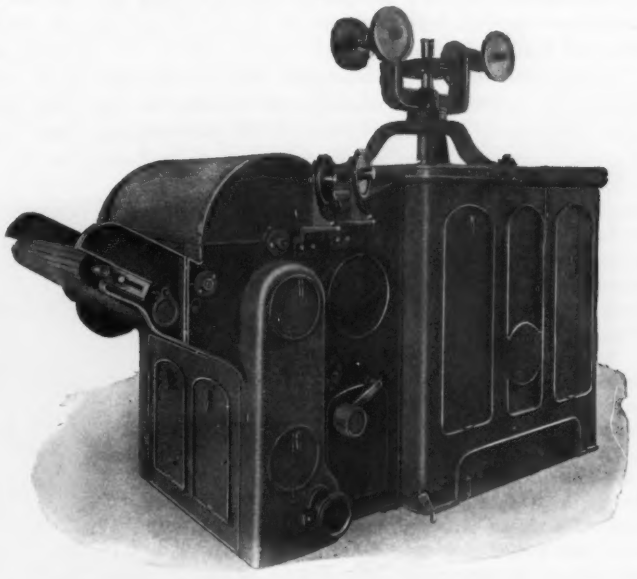

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ATLANTA, GA.

about 1,879,000 bales less to market than was on hand in the interior at this time last year, and that the world's visible supply of American is 820,000 bales smaller than one year ago, making a deficit of 2,699,000 bales in the world's available of American, compared with this date last year.

This is a startling situation for spinners of the world to face, for when one recalls how scarce cotton was everywhere last summer, even in the South, it requires no stretching of the imagination to realize how much scarcer the supply of cotton will be next spring and summer. As a matter of fact, present indications point to an almost complete exhaustion of stocks by end of the present season.

This year's crop is being marketed in record breaking speed, and the faster it is marketed now, the less there will be to market later on.

Statistical developments after the new year are likely to be sensationally bullish, as stocks begin to decrease from month to month until the season draws to a close.

In event of exports exceeding 5,000,000 bales—and they are now running on a basis of 5,885,000 for the whole season—America will have exported herself. So what would be the result if the present basis of exports for the season is maintained?

H. A. Metz & Co., Inc., with southern offices at Charlotte, N. C., have developed a new sulphur green, known as Sulphur Fast Olive Green. This is said to be exceptionally fast to light and washing, an after-treatment with chrome and copper, which slightly changes the shade, gives it this desirable feature. The dye is soluble, and can be used on any kind of machine.

"Cotton, the Universal Fiber."

With a view to supplying the demand for a book giving general information concerning cotton and the stages through which it passes in its development from the staple to the finished product, the *Dry Goods Economist* has published "Cotton, the Universal Fiber," by W. D. Darby, which gives a comprehensive yet condensed story of cotton, its history, its production and the final form in which it reaches the consumer.

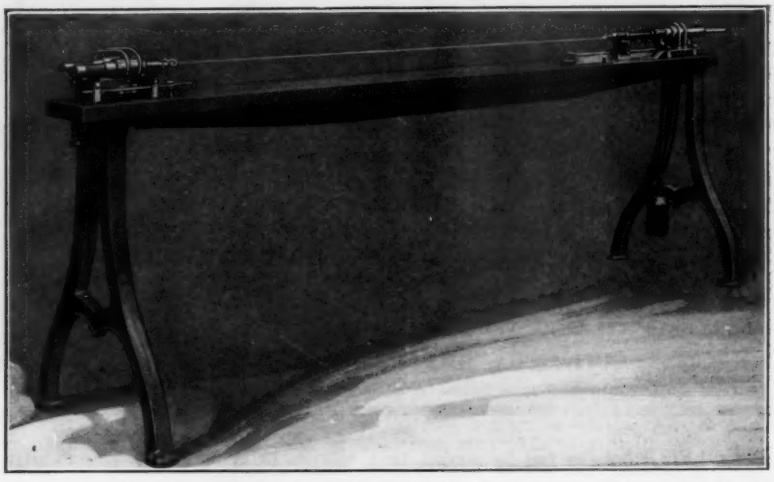
While written in a form of most interest and help to the lay mind in offering a complete, non-technical presentation of the industry, Mr. Darby's book contains much of interest to the textile man in that it assembles, between the covers of a small volume, a practically complete story of his industry. Chapters tell interestingly of the history and distribution of cotton; the process of its growth, cultivation and marketing; a summary of the development in machinery to the present state of efficiency; and then the reader is carried through the various processes involved in the manufacture of the fiber into yarns, gray goods and finished products. Another section explains the method of distribution of the products from the mill to the retail store.

The final chapter is devoted to a dictionary of cotton goods which, in addition to the definitions of the terms listed, gives some description of how the merchandise represented is made or manufactured, and often tells the uses of the goods described. The book contains 68 pages and 12 illustrations. It is published by the Dry Goods Economist, 239 West 39th St., New York City.

Inventions in Textile Equipment

At the fall meeting of the Southern Textile Association in Greenville in October, a part of one session was devoted to the description of new inventions by southern mill men. The special section in the October number of COTTON included illustrated descriptions of a number of these devices among the other new equipment described. The November issue carried brief outlines of the inventions described at the Association meeting.

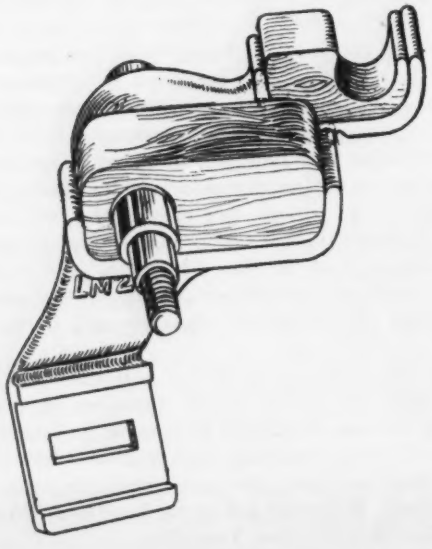
Finding, however, that a considerable interest was manifested in this feature of the meeting, and realizing the potential opportunity for active interest in this phase of textile manufacturing development on the part of the mill men of the southern section, COTTON presents this month descriptions of some of the inventions discussed at the meeting in Greenville which have not before appeared here, as well as other equipment devised by southern mill men recently brought into notice.



Among the southern inventions at the Greenville meeting was the Sizemore gearless banding machine, invented by T. A. Sizemore, treasurer of the Association and superintendent of the American Spinning Company, Greenville, S. C. An illustration of this machine is shown herewith. One of the important features advanced for this machine is its economical simplicity of operation; as the name implies, Mr. Sizemore's machine operates without any gears whatever to break or wear out; the construction of the machine, with the exception of the bed, is entirely of iron and steel. The bed is made of hard wood.

Another advantage which users point out for this machine is the fact that the twisting is done from both ends of the machine, giving an even and uniform twist; and also that with the loop-twisting device used, the loops are given the same amount of twist as the body of the band.

The operation of the machine is somewhat as follows:

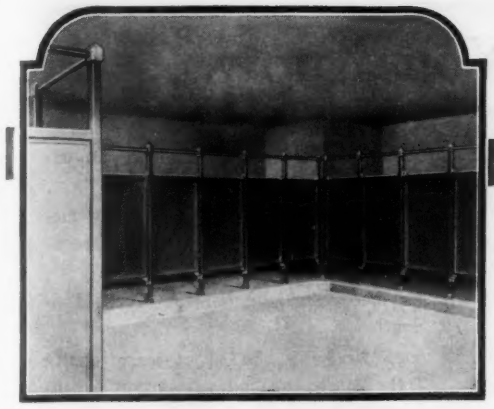


The desired number of bobbins of roving are placed on a creel on the floor (which is supplied with the machine, but is not shown in the illustration). The yarn or roving is drawn from the bobbins, looped to one hook at the left-hand end of the machine in the cut, placed around the hook at the other end and brought back and tied to the other of the two hooks of the twisting arrangement at the left-hand end of the machine. Then the two hooks holding the two ends of the strands are revolved by means of an open belt passing over the two pulleys shown, both turning in the same direction. This twists the two strands of yarn to the right, and in so doing, naturally shortens their length, which draws in the hook at the other end of the machine. At the end of this hook is connected a mechanism which supports the weight shown in the illustration. When the desired amount of twist is given the roving or yarn, the forward motion of the hook connected to this mechanism automatically throws the crossed belt at this end of the machine onto the tight pulley, which operates the single hook in the opposite direction, giving a left hand twist to the two strands already formed. At the same time the crossed belt shifts on a connecting rod shifts the open belt at the other end of the machine to the loose pulley, stopping the twisting of the two strands. When the band is finished the machine automatically stops itself, and the operator removes the band and places it on a convenient rack provided for the purpose.

The belt shifting mechanism is so arranged that the amount of twist to be put into the band can be predetermined and provided for merely by changing the amount of weight placed on the chain, this making it possible to make either a hard or a soft band.

Mention was also made in the meeting of a wooden bearing for the whip roll arms on looms, invented and patented by another operating executive at the American Spinning Company, W. B. Williams, the overseer of weaving. The attachment of this bearing, which is shown in the accompanying illustration, is said to be easily and quickly performed, no new parts on the whip roll being necessary.

(*Continued on page* 165)



Typical battery of Sanymetal Toilet Partitions

Why they insist on Sanymetal

EVERYWHERE plant engineers and owners *who get the facts and figures* have approved and adopted metal toilet partitions because metal has thoroughly established its merit as the most sanitary, lasting, and inexpensive material. And the reason so many of these industrial plants insist on genuine Sanymetal Partitions is because they know beyond any question that Sanymetal delivers the greatest measure of service that can be bought in any metal toilet partition.

Built in stock unit sections for toilets, showers, urinals, dressing rooms, and screens. Special rust-resisting metal with fine baked enamel finish. Dirt-and-water-shedding construction down to the last minor detail. Solid, workmanlike installation, well secured at floor and side walls. Doors that can't be banged because they are hung on the *original* Sanymetal springless Gravity Hinges.

Sanymetal Interior Dividing Partions for office and mill are pictured in Catalog No. 4.

Write for Sanymetal Toilet Catalog No. 2, showing many suggested layouts and designs.

THE SANYMETAL PRODUCTS COMPANY
986 E. Sixty-Fourth St., Cleveland, O.

Sanymetal
TRADE MARK U. S. REG.

NON-FLUID OIL

Plugging the Profit Leaks

Every actual waste in a mill should be avoided—as it represents a corresponding loss of profits which is unnecessary. Leaking oil often goes unnoticed although it represents a waste that is entirely unnecessary.

PLUG THE LUBRICANT LEAKS BY USING

TRADE MARK REGISTERED IN UNITED STATES PATENT OFFICE
NON-FLUID OIL

Modern Textile Lubricants

NON-FLUID OIL has been used for over twenty-five years in leading mills because it yields constant and positive lubrication to bearings—lubricates like the best liquid oil but lasts longer—won't drip or waste from bearings. A saving both in lubricant and labor in oiling—as fewer applications are needed.

And oil in the bearing is not on good cotton—depreciation from oil stained goods is well worth saving.

If you are not already using NON-FLUID OIL throughout your mill fill out the coupon for a free sample and we'll send a copy of our "Bulletin on the Lubrication of Textile Machinery" free.

New York & New Jersey Lubricant Company

401 Broadway New York
Southern Agent,
L. W. Thomason, Charlotte, N. C.

Ample Stocks at Our Branches:

Charlotte, N. C.
Greenville, S. C.
Atlanta, Ga.
New Orleans, La.

N. Y. & N. J. Lubricant Co.

Please send Testing Samples and Bulletin on "Lubrication of Textile Machinery" to

Name _____

Address _____

C-12-22

Better Lubrication At Less Cost Per Month

Notes About Men You Know.

FRANK A. DENNIS, of Tallassee, Ala., has been appointed manager and superintendent of the Union Division, Consolidated Textile Corporation, at La Fayette, Ga., succeeding J. R. Killian, resigned.

EDWARD CHANDLER has been promoted to the position of overseer of carding at the Exposition Cotton Mills, Atlanta, Ga. He succeeds James E. Fields, resigned.

L. L. WILLIAMS recently resigned as overseer of weaving No. 2 at the Cotton Mill Products Co., Natchez, Miss., to become night overseer of weaving at the Wennonah Mills, Lexington, N. C.

R. A. WHATLEY resigned a few weeks ago as superintendent of the La Fayette Cotton Mills, La Fayette, Ga., and the employees of the plant presented him with a beautiful gold chain with Shrine emblem upon his leaving the organization.

ROBERT F. STEELE has been promoted to the position of superintendent at the La Fayette Cotton Mills, succeeding Mr. Whatley.

WALTER A. RICHARDS, assistant superintendent and resident engineer of the Columbus Manufacturing Co., Columbus, Ga., has resigned to accept the position of city manager of the city of Columbus, effective November 4. Mr. Richards is a son-in-law of F. B. Gordon, president of the Columbus Manufacturing Co.

S. B. LAWRENCE has become the overseer of weaving at the Gluck Mills, Anderson, S. C. Mr. Lawrence has resided in Anderson for a number of years and has been connected with the Draper Corporation.

GEORGE PETTY has been promoted from section hand to second hand in spinning at the Loray Mills, Gastonia, N. C.

C. F BLUME has been promoted from second hand to assistant overseer of spinning at the Loray Mills, Gastonia, succeeding C. L. Windham, resigned.

G. A. GULLEDGE has become night overseer at the Adams Cotton Mills, Macon, Ga.

W. L. BRAY, formerly of Central Falls, N. C., has accepted the position of carding overseer at the Sapona Cotton Mills, Cedar Falls, N. C.

FRANK BECK was promoted to overseer of carding at the Central Falls (N. C.) Mills.

R. R. BAIN, who recently resigned as overseer of carding at the Sapona Cotton Mills, Cedar Falls, N. C., has accepted a similar position at the Haw Manufacturing Co., Haw River, N. C.

J. W. FARIS, from Henderson, N. C., has become overseer of spinning at the No. 1 Mill, Fulton Bag & Cotton Mills, Atlanta, Ga.

E. S. TENNETT, purchasing agent for a large number of southern textile mills, has been elected a director of the Saxon Mills, Spartanburg, S. C.

J. P. ABNEY, president of Grendel Mills Nos. 1 and 2, Greenwood, S. C., has been elected president and treasurer of the Panola Cotton Mills, Greenwood, succeeding B. B. Gossett, who resigned because of other duties.

H. R. RIDDLE, overseer of spinning at the Greenwood (S. C.) Cotton Mills, died last month, following an extended illness.

WILLIAM GREGORY has been promoted from master mechanic to superintendent of the F. W. Poe Mfg. Co., Greenville, S. C., succeeding the late A. T. Guy.

W. F. PARKER has become superintendent of the Lincoln Cotton Mills, Southside, N. C.

KARL VON RUCK, Asheville, N. C., internationally known authority on the treatment and prevention of tuberculosis, and president of the Spray Cotton Mills, Spray, N. C., died recently following an illness of several weeks.

W. W. SAYERS, of the Link-Belt Company, has been promoted to the position of chief engineer of the company's Philadelphia works and eastern operations. For many years Mr. Sayers was representative of the company in the Chicago territory, in the lines related to power house machinery, coal storage, Peck carriers, etc., and was later in charge of the locomotive crane department. His headquarters in the future will be at the company's office in Philadelphia.

CHARLES L. HAMMOCK, superintendent of the Walton Cotton Mill, Monroe, Ga., died on October 16. Mr. Hammock had been in ill health for some time.

CAMERON LANIER has been appointed superintendent of the Piedmont Cotton Mills, and the Egan Yarn Mills, at Egan, Ga.

PAT MCGARITY, who has been with the Arcadia Mills, Arcadia, S. C., for the past 15 years, with the carding and spinning departments, and for the past five or six years as assistant superintendent, has been promoted to the position of superintendent of the Mills Mill, Greenville, S. C.

C. W. PARROTT, who for a number of years has been with the P. H. Hanes Knitting Co., at Winston-Salem, N. C., has succeeded Mr. McGarity as assistant superintendent at the Arcadia Mills.

G. A. POPE has been made overseer of spinning at the Grace Mill, Rutherfordton, N. C.

O. L. DERRICK has accepted the position of overseer of No. 1 spinning at the Winnsboro (S. C.) Mills.

D. S. SANDERS, Paterson, N. C., has been promoted to night overseer of winding at the Grace Mill, Rutherfordton, N. C.

EDWARD SWORDS has returned to his former position of overseer of spinning at the Adams Cotton Mills, Macon, Ga.

J. W. SISK has been made assistant superintendent at night at the Grace Mills, Rutherfordton, N. C.

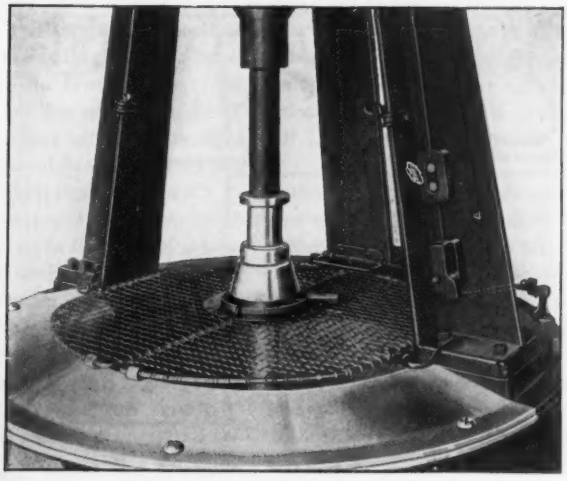
W. E. HAMMOND has resigned as superintendent of the Mills Mill, Greenville, S. C.

C. W. WALLS has become overseer of carding at night at the Grace Cotton Mills, Rutherfordton, N. C.

WILLIAM CHRISTIAN recently resigned as superintendent of the Appalachian Mills, Knoxville, Tenn.

J. M. KELLY has become carding overseer at the Lauderdale Mills, Meridian, Miss.

J. R. OGBURN has become overseer of carding and spinning at the Beaver Cotton Mills, Thomson, Ga.



TOLHURST 48-inch Self-Balancing Direct Motor Driven Extractor

—And NOW *Automatic Safety Guards for* TOLHURST

(Registered U. S. Patent Office)

EXTRACTORS

Two sturdy covers over the top of the basket prevent access by the operator to the revolving basket—protect the operator from carelessness or oversight—and LOWER THE COST OF LIABILITY INSURANCE.

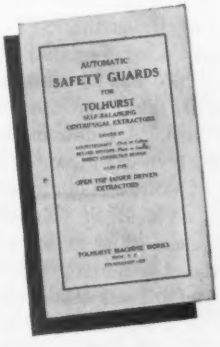
The Extractor cannot be started until the guards are closed.

The Guards cannot be opened until the basket comes to a complete stop.

The Guards prevent access to the basket but permit free access of air and clear view of interior.

The Guards are hinged to swing backward so as not to interfere with loading and unloading of the basket.

Tolhurst Automatic Safety Guards can be obtained at a small additional cost with new Extractors, and are easily attached to those now in use.



A Folder, describing in detail the Tolhurst Automatic Safety Guards, will be mailed free to those requesting it.

TOLHURST MACHINE WORKS, TROY, N. Y.

Established 1852

J. F. LEHMAN is now night superintendent at the Lowe Manufacturing Co., Huntsville, Ala.

I. W. CURTIS, general superintendent of the Dartmouth Mfg. Co., New Bedford, Mass., has resigned. Before going with the Dartmouth corporation, Mr. Curtis was superintendent of the Dwight Mfg. Co., of Chicopee, Mass., for six years.

SIGMUND ODENHEIMER, president of the Lane Cotton Mills, New Orleans, La., has donated an aquarium, to cost several thousand dollars, to the children of New Orleans.

B. B. COMER, president and treasurer, and Donald Comer, vice-president, of the Avondale Mills, Birmingham, have become heavily interested in the recent purchase of the Age-Herald, Birmingham's morning newspaper.

D. A. JOLLY, formerly overseer of weaving at the Lanett Cotton Mills, Lanett, Ala., is now assistant superintendent at the Cabarrus Cotton Mills, Kannapolis, N. C.

J. J. HYDE has been promoted from assistant overseer of weaving and slashing to overseer at the Lanett Cotton Mills.

M. C. MORGAN is now assistant overseer of weaving and slashing at the Lanett Cotton Mills, having been promoted from second hand in the same department.

D. D. GOLDEN, formerly second hand in weaving at the Lanett Cotton Mills, has accepted the position of overseer of weaving at the Avondale Mills, Alexander City, Ala.

VONCIL VICKERS has been promoted from loom fixer to second hand of weaving at the Avondale Mills, Alexander City, Ala.

P. C. GILLESPIE, formerly overseer of weaving at the Avondale Mills, Alexander City, Ala., is now overseer of weaving at the Consolidated Textile Corporation, Pelham, Ga.

W. J. GRANT, who was in charge of weaving at the Avondale Mills, Birmingham, Ala., for several years, has been promoted and is now superintendent of the Avondale Mills, Alexander City, Ala.

T. H. BARRETT has been promoted to the position of overseer of weaving at the Avondale Mills, Birmingham, Ala.

ELLIS T. GURRY, who for a time was connected with the Eatonton Cotton Mills at Eatonton, Ga., has become superintendent of the Groveville Mills, at Groveville, N. J.

ALBERT A. JENKS, president of the Jenks Spinning Co., Pawtucket, R. I., died suddenly of heart failure on November 7. Mr. Jenks was associated with the textile industry for many years, and at the time of his death was a director of the Fales & Jenks Machine Co., of Pawtucket, president of the Pilgrim Mills, Fall River; director of the Judson Mills of Greenville, S. C.; a director of the Queen City Cotton Co., of Vermont, and of the Seaconnet Mills of Fall River. He was 63 years old and was a lineal descendent of Joseph Jenks, who founded the village of Pawtucket 250 years ago. A widow and one son, Robert J. Jenks, survive.

W. IRVING BULLARD, treasurer of the National Association of Cotton Manufacturers, who recently met with a serious accident in Rio de Janeiro, Brazil, is recovering nicely, according to latest advices on his condition received by the Association, which point to a complete recovery. Mr. Bullard was attending the International Cotton Conference as a representative of the National Council of America Cotton Manufacturers and the National Association when the accident occurred.

LEE S. SOSSAMON, formerly a well-known superintendent of Georgia, has gone to Corsicana, Texas, where he will dismantle a twine mill and remove the equipment to California. Mr. Sossamon will operate the mill when it is completed. The organization will be known as the California Cordage Company, and the mill will be located at Orange, California, on the railroad between Los Angeles and San Diego.

CHARLES HENRY HUTCHINS, chairman of the board of directors of the Crompton & Knowles Loom Works, Worcester, Mass., died at his home in Shrewsbury on November 15. Mr. Hutchins was for many years president of the company, and also maintained other industrial connections. He had been retired from business since February, 1917, when he was made chairman of the directorate of the Crompton & Knowles company.

JAMES BUTTERWORTH, for many years president of H. W. Butterworth & Sons Co., Philadelphia, died on November 14, after a brief illness. He was 83 years of age. He is survived by one daughter and his three sons, H. W., J. W., and A. W., who are officials in the business of H. W. Butterworth & Sons Co., manufacturers of textile finishing machinery.

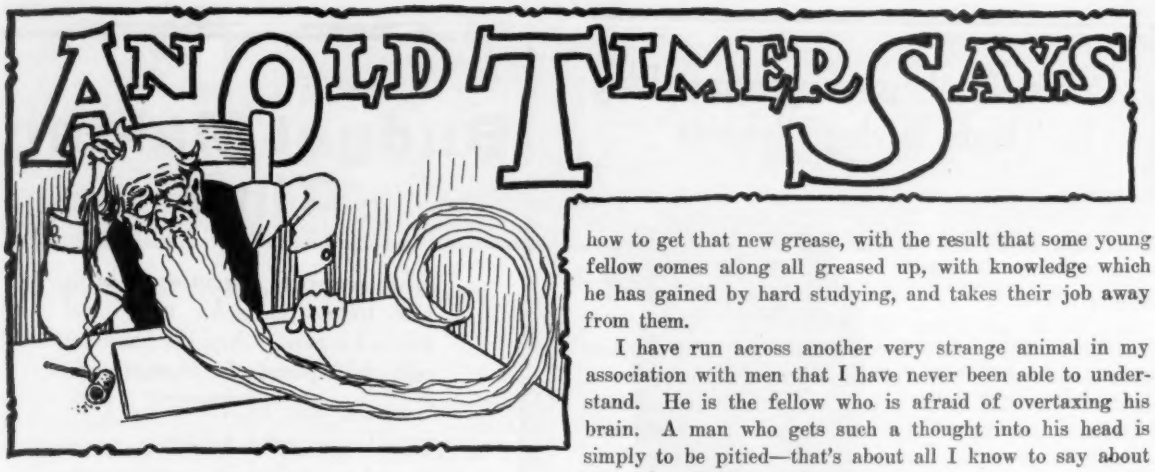
JOSEPH J. BRADLEY, JR., has been selected to succeed his father, the late Joseph J. Bradley, as agent of the Huntsville, Ala., plant of the Merrimack Manufacturing Co.

Instruction Booklets on C. & K. Looms.

Service and instruction on loom operation in a new form has been established by Crompton & Knowles Loom Works, Worcester, Mass., who have begun the publication of instruction books on the various motions used on their looms. The first of these, issued recently, takes up the Filling Detector No. 4, giving good, practical information on the operation and setting, adjustment and maintenance of this motion. The booklet explains the subject in a clear, though elementary manner, and gives information on this part which should form a helpful asset to the knowledge of men connected with weaving departments in which looms using this device are operated.

This booklet is the first of a series which the company proposes to publish covering these items on some of the different motions which they build, and also certain general subjects. The second of the series, dealing with "Jacquards," outlines the characteristics of the three types of Jacquard machines commonly used today and certain modifications of these types, together with some important points to be observed in their selection and care. No attempt has been made, however, to touch upon Jacquards for highly specialized fabrics, because of the variance in conditions that would be encountered.

Automatic loom installation is treated in the third booklet of the series, issued under this title, and in this is outlined the course which the company considers the most advisable to follow in the installation of new automatics, and the service provided for starting up these looms. Subsequent booklets will discuss the automatic stationary magazine, the four-chain multiplier, the mechanical warp stop motion, and the multiple wire filling detector. These booklets are prepared primarily for distribution among mill men where the looms of this company are being used.



Surely our young men in the mills of the South will now begin to realize what a golden opportunity lies ahead of them in the textile industry.

For years "Old Timer" has been predicting that we as overseers and superintendents of the South have the brightest prospects of any textile section in the world, and now since New England has gotten such a black eye, caused chiefly by the recent labor troubles, the time has been brought much nearer when the South will dominate the world in the manufacture of textiles. There is certainly no doubt but what new capital will seek investment in southern mills—new mills will surely be built—these new mills will certainly need overseers and superintendents.

Mr. Overseer. Mr. Superintendent. Are you preparing yourself for one of those good jobs? Are you studying, reading and doing all in your power to make yourself a more efficient mill man, or are you just drifting along spending most of your time thinking up excuses to keep the boss satisfied until he wakes up to your game and begins to look for a live wire?

Get busy, Mr. Overseer; Mr. Superintendent. Prepare yourself for that bigger job that you are going to miss if you continue to drift along with the crowd. If you have the grit to get down to hard work—I don't mean running around over your job like a chicken with its head cut off—but do all you know how to do to improve yourself—read everything you can get your hands on pertaining to textiles—study the technical articles in COTTON and make carefully conducted tests in your room or mill to see if the ideas set forth are applicable to your particular kind of work.

If you start making tests and follow them carefully, you will certainly learn a lot of things about your job that you never knew before. The trouble with most of us in making tests is that we make them in such a slip-shod careless sort of way that we do not learn anything and soon get disgusted and quit.

You know, it takes a lot of "spunk" for a man to knuckle down to try to learn more about his work when his job is running along just like it was greased. But just remember there never has been a grease found that will last forever. You must add some new grease from time to time or the blamed thing will wear out.

Catch the idea? Are you adding any new grease?

Some overseers and superintendents don't ever learn how to get that new grease, with the result that some young fellow comes along all greased up, with knowledge which he has gained by hard studying, and takes their job away from them.

I have run across another very strange animal in my association with men that I have never been able to understand. He is the fellow who is afraid of overtaxing his brain. A man who gets such a thought into his head is simply to be pitied—that's about all I know to say about him that will do to print.

There is no such thing as filling a brain full. Of course a man can get tired of studying just one particular thing, but let him divert his mind by studying something else for a while, and it is refreshed again.

Under the very broad head of textiles, no overseer or superintendent need ever have to hunt very hard for all the diversion he needs. In fact, any job on plain white work has an unlimited field for improvement.

Do you honestly believe carding, spinning or weaving will be done fifty years from now just like it is being done today? If you do, you are a hopeless case and you are losing your very valuable time by reading this article. Better stop right now and go buy you a copy of "Nick Carter," "Diamond Dick" or something else you will get some pleasure out of.

I can remember when the first weavers in South Carolina were given six looms. Only a very few of the most expert weavers could get six looms. Now what are the most expert weavers running?

Oh, yes!, you say, automatic looms did all that. But how about plain loom weavers today? Many of them are running 12 and 14 looms; that's over 100 per cent increase

And of course many of you remember when a six side spinner was a good spinner, with the frames stopped about one-fourth of the time for doffing.

This same progress may be traced on through the mill. Well, now, do you think it has *all been done* and we have run against a brick wall and are going to stand still until doom's day? Edison invented the electric light, but just think of the men who have improved on his idea. He also invented the phonograph—then "His Master's Voice" came along and made more money out of it than Edison did. Space will not admit of more illustrations.

Just for your own private information, suppose you begin to make a note of the different items in your room or mill that you know or have reason to believe will be done better some day by some smart fellow.

And then, why not let that smart fellow be *You*?

When an idea comes to you, don't let it get away like most men do. Make a note of it in your notebook, then when you get time give it full and earnest thought. Try to write it out just the way your imagination tells you it should be. If you would like to know what the most expert mill men in the South think about it, send it along to

(*Continued on page* 156.)

New, Better, Less Expensive Way To Clean Roving Bobbins

The Termaco Bobbin Cleaning Machine cleans about 36,000 bobbins per day.

Without adjustment, it takes any size bobbin not larger than 12 inches in overall length.

If you were at the Exposition at Greenville, you saw how the Termaco Bobbin Cleaning Machine operates. It is simple to feed and the bobbins are thoroughly cleaned without damage. In fact, bobbins splintered by hand cleaning have the splinters brushed off and gradually become smooth again.

Termaco Bobbin Cleaning Machines cut down the annual cost of bobbins in addition to substantially cutting the cost of bobbin cleaning.

During the past year Termaco Bobbin Cleaning Machines have undergone rigid tests under actual mill operating conditions. They have proved to be as efficient, durable and simple in operation as our Utsman Quill Cleaning Machines, which, during the past five years, have given remarkably satisfactory service in hundreds of mills in this country and Canada.

All parts of Termaco Bobbin Cleaning Machines are interchangeable. All gears are cut gears and are guarded. Ball bearings are used in all high speed shafting. Termaco machines are built for long, uninterrupted service.

In comparison to the better bobbin cleaning and actual saving in dollars resulting from the installation of a Termaco Bobbin Cleaning Machine, the cost of the machine is small.

Write our Engineering Department for complete particulars regarding what the Termaco will do for your own mill.

TERMACO

Every machine trade-marked "TERMACO" is sold under a binding guarantee as to workmanship, material and operation.

THE TERRELL MACHINE CO.

(INCORPORATED)

Engineering Department **Charlotte, N. C.**

General Supply Co., Danielson, Conn., Representatives for N. Y. & N. E.

Budget Making Time

The successful executive in business today *plans his work and works his plan.* And the financial part of his plan is the Budget.

Consider your BUDGET a Business Guide—not a Law.

Based on judgment, past experience, figures and facts, it forecasts income and expenditure. It shows the amount of expected sales, the consequent production schedule and inventory requirements. It is the commitment sheet of your business.

The Budget protects profits by preventing loss. It justifies the spending of money by *necessity and expediency*—not by tradition. It is the one dependable safeguard against overproduction, overexpansion and overexpenditure. It is the cause and effect of financial policy.

It is the link of confidence between business and its creditors.

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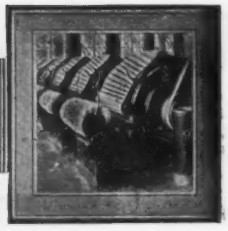

Mechanical Laws and Machine Design.

EDITOR COTTON:

It is interesting to note how "Wash (Mass.)" holds to an idea without proving his conclusion. He reminds me of an old steam engineer who claimed that he received his training in Massachusetts. It was the fortune of the writer to be assistant to this old gentleman, and as the days passed on I would attempt to get into the good graces of my chief in order to learn something of the fundamentals of steam engineering. But everytime I would get pretty close up with a question, this old man would remind me that there was a great mechanical mystery existing between the relationship of the fly wheel and the governor that few men understood.

So it is with "Wash." Every time the boys begin to feel hopeful that they are getting onto some of the difficulties in the card room, "Wash" comes in with that mysterious skeleton which he calls the relationship of speeds, tension, presser pad and cones.

It was not the purpose of my letter in the July number to convince "Wash" that his ideas are wrong, but that I might induce him to give us practical facts and figures showing that there are real forces and mechanical principles existing to produce the relationship such as he says exists. In his September letter, replying to my July letter, "Wash" says that I have the right spirit, but the wrong dope on fly frames. He charges that I frequently quoted his statements without explaining why I did so. I am sure that the readers understood this, for as a rule it is impossible to fully understand an answer to a proposition without having the question before us. "Wash" further charges that I passed over Newton's law of mechanics without attempting to explain its relationship to the presser rod as attached to the hollow leg of the flyer. Newton's law of forces tells us that if a body be at rest it will remain at rest or if in motion it will move uniformly in a straight line till acted on by some force. Please let "Wash" keep this law in mind as we shall come to it again.

"Wash" also charges that in all my quoting of his statements I did not attempt to answer his logic. Webster says that logic is the science or art of exact reasoning. I shall not attempt to reply to the several questions of "Wash" in order, but will rather treat them as a whole, for there really is but one question—that of winding.

All good carders know that there is a great deal more tension between the first wrap on the presser finger and the point of bobbin contact than there is between the top of the flyer and the front roll. Therefore, in the light of logical reasoning, this condition clearly shows that the sliding friction of the strand on the several points on the flyer and finger set up the winding tension, also, naturally, this gives two tensions between the bobbin and the front roll. But, in the light of logic, let "Wash" show how this can be so if, as he says, when everything is going all right all the tension is between the bobbin and the presser pad.

"Wash" is altogether right when he says that a higher frame speed will make a firmer bobbin, for Newton's law of mechanics teaches that the pressure of the presser pad on the bobbin will be in proportion to the square of the velocity of the presser leg in one second of time, divided by the radius of the leg circle. But this same law also teaches that the further away from the center of gravity we place the weight on a slasher presser roll, the more condensed will be the warp on the beam. The same applies to the weight on the picker friction in regard to a firmer lap. But where is the weaver or the carder who would claim that the tension in either case was produced by the press roll or lap pin. The purpose of both the press roll on the slasher and the friction on the picker is to keep the beam and the lap in a uniform condensed shape while winding and for further use.

So it is with the presser pad on the fly frame. If, under normal conditions, we were to find that there was too much tension between the bobbin and the first wrap on the finger, and that the tension was all right between the top of the flyer and the front roll, the logical thing to do would be to reduce the number of wraps on the presser finger, if thoroughly cleaning the flyer and finger with Spanish whiting did not help the tension.

I could go right on pointing out all the causes that change the tension on fly frames, but it is not necessary. In every case we should be governed by principle; for instance "Wash" states his idea is more clearly seen in starting up a slubber, that in the first traverse to the top the ends run slack, and that after reducing the speed, thereby reducing the pad pressure the ends will tighten up on the down traverse. Now if this is a logical fact controlled by Newton's law as it affects the presser pad, let "Wash" tell us why the same thing would not take place on a frame of any size, at any time during the set, whether the carriage was going up or down? Doesn't "Wash" believe the same tightening of ends would have taken place if the correct bottom cone gear had been on the machine and that he had cleaned the cone belt?

"Wash" is about to admit that a bobbin-lead fly frame

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishng plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

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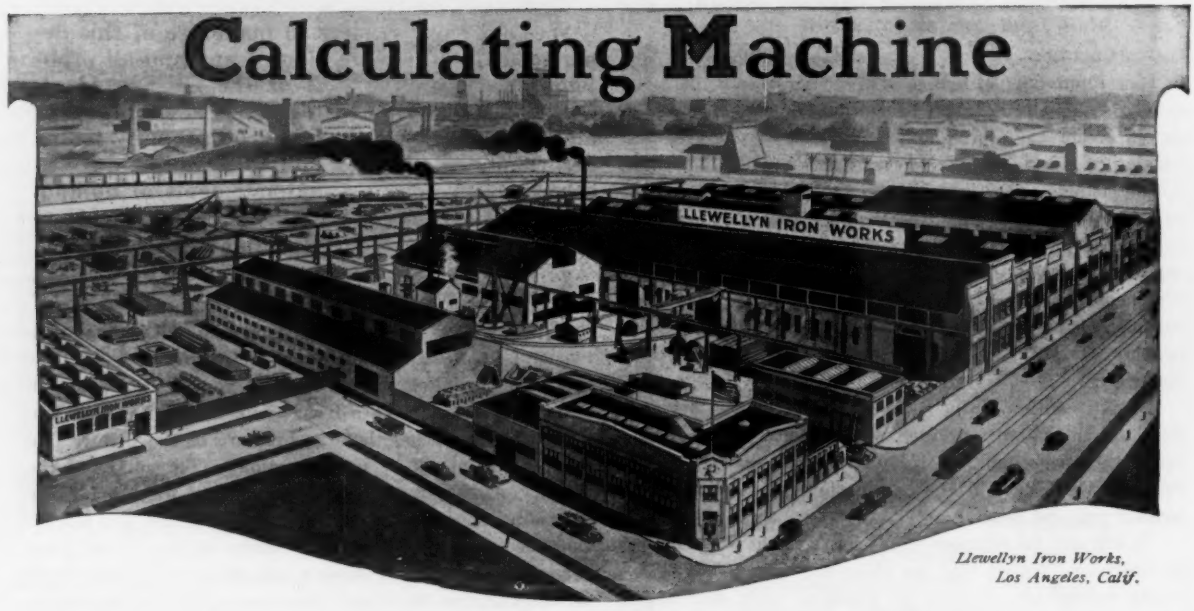

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will do good work provided we have cotton, or stock, of which the average length is longer than the distance from the contact of the presser on the bobbin to the first wrap on the finger. This statement certainly does bring us to one of "Wash's" so-called defects. Since I must answer his logic let me ask "Wash" what this distance would have to do with the length of the cotton, if, as he says, when fly frames are run at the exact designated speed for a given hank roving, with the cones designed for this particular frame, etc., all the tension is between the presser pad and the bobbin?

Again, if those distances, wraps etc., are exactly the same, governed by the same laws, why would we need longer staple cotton for a bobbin-lead than for a flyer-lead frame? As a matter of fact, none of our so-called local cotton meets "Wash's" requirements on our speeders, and the longest staple would not do on our slubbers.

"Wash" wants to know if the average weight of a full speeder bobbin is 11 ounces, and assuming the top cone is concave and the bottom cone convex, what would be their outline if the presser pad packed in 16 1-2 ounces more, making a bobbin, I suppose, weighing 27 1-2 ounces. In answer to this I will say that the weight of the bobbin has absolutely nothing to do with the winding in this case, anv more than it would if we were running a frame on 5 hank roving with say a roving twist 1.30 times the square root of the number, and changed to 5s yarn with 4.75 twist, S. R. If this frame was operating in the first case under Newton's laws, it will operate under the same law in the second case. If we can handle a frame on a rainy day, making a firmer bobbin with the tension gears, we can also handle "Wash's" proposition with tension gears.

In order to "refute and disprove" my statement about interchangeable cones in certain makes of fly frames, "Wash" quotes from a letter written by the agent of one of the largest builders of fly frames. In this quotation this agent mentions many of these "incalculable mysteries." I personally have a great deal of respect for this agent whoever he may be. It would not be natural for this agent to take any other position in this matter of cones, for we find that from the very first attempt to use the concave and convex cones there was a suspicion that they would not prove satisfactory. The beginners with these cones had neither a mathematical rule by which they could lay them out nor practical tools with which they could carry out their plans. Notwithstanding all these drawbacks and difficulties, they did produce a concave and convex pair of cones which, running together, will wind a bobbin satisfactorily. However well this agent, or "Wash," or anybody else, may guard the mysteries they believe are wrapped up in this winding, their beliefs do not disprove the fact that every pair of concave and convex cones running together, producing a satisfactory wind on fly frames, must conform in outline to a fundamental principle of mathematics, and any set of cones laid out by that principle or rule that has a range of speed sufficient, will wind correctly on any size or make of fly frame whether it be bobbin-lead or flyer-lead, for by Newton's laws we find that every factor entering into this winding is constant in its effect. Someone has said the effect of the presser pad changes as the bobbins increase in size. It is true that the radius of the presser leg shortens slightly as the bobbin fills. It is also true that the centrifugal force of this leg is more and more direct as the radius shortens. Therefore, it is seen that one changing force balances the other, thereby keeping the pressure of the presser pad constant.

"Wash" says I am wrong about the cones, notwithstanding the fact that some of the largest mills both in this country and in England are using the one size of cones on all their frames.

In concluding for this time, let me say if "Wash" has any logical principle to show why his claims are all that he holds them to be, let us have it. In other words, if a flyer-lead frame has less slack in its gearing, better arrangement of gearing, has a different flyer and finger; if the mills using this flyer-lead can use a shorter cotton and if they get a better production or a better price for their product, tell us about it. Also if the builders did not quit building the flyer-lead frame to get rid of driving the bobbins at their highest speed while full, what did they quit for?

Everybody doesn't know why a Ford bumps harder than a Packard. There must be some vital difference in the design before such great differences in results.

The statements of truthful witnesses will convict a man on trial and send him to his doom, but they will not change the mechanical laws governing the design and operation of fly frames. K. S. (N. C.)

Some Causes for Seconds.

EDITOR COTTON:

It has been the observation of the writer, over a period of years in mill work, that it is the most obvious items that escape the notice of those in charge.

There are so many things that can go wrong in a mill that unless one is on the alert, they soon become so much the accustomed order that no one thinks of changing them. It reminds me of the story of the sentry who was stationed to guard a freshly painted park bench. The bench dried in a few days, but no one thought to give the order to discontinue assigning a sentry at this spot. As the years went by the bench rotted, but the sentry still mounted guard at this spot, though all had forgotten why. It had always been done, so it must be right. It had become customary.

The writer has known of mill men who were putting the normal poundage through their cards, and who changed the production gears when needing an extra production for a few weeks; then, after this necessity was passed, they left the high production gears in place, although it was only necessary to operate the machines 50 hours in order to keep up with the rest of the mill. They therefore lost the improvement in the quality of the work that might easily have been made.

The drawing frames in quite a number of our mills are operated at an unnecessarily high rate of speed. A close analysis would, in almost every instance, show that a somewhat lower speed would give a higher rate of efficiency without any loss of actual poundage produced, to say nothing of the decreased wear and tear on the machinery and the improved quality of the work.

Although most mills have certain standard settings for the pickers, rolls, etc., an inspection of these would yield, in many instances, surprising variations from the standards supposed to be maintained.

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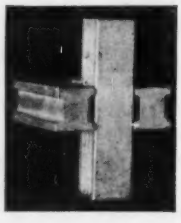

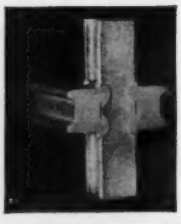

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will be admitted by all to be a very important affair, yet in a large percentage of mills this is left entirely to the judgment of the overseer of the department. No matter how able such a man may be in his own field, it is too much to expect him to have the entire mill point of view of the superintendent (or that the superintendent should have), besides, if the department before his own has not put in the proper twist for the best results, he is certainly under an unfair handicap.

This matter of twist is one that is certainly worth all the attention that can be given it from the first process where it is inserted to the last. No hard and fast rule can be laid down, but careful experimenting by any mill man will result in some interesting and helpful findings.

A wise precaution that is sometimes neglected is that of having some system to insure that the proper change gears are run on the frames at all times. Sometimes by mistake, and sometimes intentionally, gears of different sizes are put on. A careful inspection of all the twist and draft gears running in a mill will frequently be startling. The chances of their being wrong are greatly diminished where there is a central supply room carrying all change gears, and the proper gears for all numbers worked out and charts made of them. But even then a periodical inspection will be found profitable.

The lack of what might be termed analysis or investigation is the frequent cause of confusion in a mill organization. Something goes wrong; bad work comes through; the percentage of seconds rises. Under such conditions, the superintendent in charge is likely to call in his overseers and read the riot act, which may or may not be wise, but certainly it seems that the first step should be to fix the responsibility for the cause of this bad work. After that, all his attention and efforts can be concentrated on correcting the causes instead of scattering and wasting his energy over the whole organization.

If bad work is coming from the card room, is it due to poor carding, bad piecing, fanning off, bad rollers, wrong roll settings, or what not of the hundred and one other things that can go wrong to the distraction of mill men and the destruction of profits?

If seconds are high, what proportion can be attributed to each defect? Perhaps it is known that sloughed filling is causing some of them. Black oil and bad selvages some others, but a record, easily kept in the cloth room, would give the exact poundage of seconds due to each defect, and when the facts are in possession of the superintendent, he will be in a position to direct his attention to those that are the worst, and certainly his efforts would accomplish a great deal more.

This plan can also be employed almost indefinitely. For instance, if production is low, in certain departments, as in the weave room why is it low? Is time lost in cleaning off, or is it due in the failure to put in warps promptly, or because of yarn breakage? If due to excessive yarn breakage, is the yarn breakage caused by poor yarn, or wrong loom settings? These and similar questions must be answered before the best results can be obtained. A good plan in cases of this kind is to put a reliable man, who can be trusted, into the department to keep a record of actual stoppages and their causes over a reasonable period of time. It will not be long before such a record will show where some lost motion can be taken out.

The overseer in a department is so close to his work that often he becomes accustomed to seeing things that are wrong without having any impression made on his mind, whereas a person from outside his department would promptly point them out.

Again, many overseers are incapable of the analysis process indicated, but were these things pointed out to them, they would be entirely competent to correct them.

Another item of no small importance in this day of high-priced supplies is that of some system to insure that no parts that could be salvaged are allowed to go to waste. A plan that has given good results in a number of instances is that of having all broken and worn-out parts returned to the machine shop or the supply room, as the case may be. These parts can in this way come under the inspection of a competent person, and a large saving can frequently be made.

Too often these broken and worn-out parts are sent to the scrap heap without proper inspection, and as a result much that could be repaired and used again is lost. It is also frequently possible for a man in the machine shop, by inspecting a broken part, to point out reasons for the breakage that could have been avoided and which otherwise might have escaped unnoticed.

As "Old Timer" pointed out in a recent number of COTTON, it is really astonishing the number of things in need of correction that can be found in the average mill, even under excellent management. It is not at all an unwise procedure for each of us, when we read or hear of such experiences, to investigate conditions in our own plant before thinking how much better run or better handled our plant is than the one we are reading about.

Contributor No. 75.

More Light on the Chinese Mill Problem.

EDITOR COTTON:

In his letter in the July issue of COTTON, "Wash (Mass.)", answering my letter entitled "Solving a Chinese Mill Problem," printed in the May issue, certainly has evolved the "Chinese puzzle" into an "American-Chinese puzzle," for reasons to be explained later.

Unfortunately, my copy of the July issue did not reach me until just recently, as it had been borrowed by an American friend. It was a wonderful surprise to read "Wash" practical expression written so proudly and assuredly. I hunted for the May issue containing my original letter, but lo! it had also been borrowed by an American friend. This, then, is another "Chinese puzzle," as you may call it—copies of COTTON are so popular and in such demand in China, that such an extended time has elapsed before the two copies have been retrieved and the answer is being written.

There ain't so many darn fools in Chinese mills as "Wash" thought; there ain't so many so-called Chinese puzzles as "Wash" thought. But listen, does his letter imply that an English speaking man has been working in that mill for years and doesn't know the diameters of the rolls and the speeds of the fans and beaters in the pickers? Well, hardly! Unless he is totally blind, deaf, lame, and

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fingerless—and there ain't no such animal in China in active mill work.

"Wash" would be dead right in what he says if all machinery was built solely for spinning American cotton and was to be located in Massachusetts. But not in China, where the cotton mills are spinning mainly low counts, using short staple Chinese and Indian cottons, and on machinery built to suit such staples. The staple of our cotton is from ½ to ¾ of an inch in length. There is only one mill in China whose machinery is built to spin fine counts; the rest of us are on low counts. The diameters of the front rolls being ⅞-inch and the middle rolls ¾-inch in the spinning frames, and 1-inch front rolls and ⅞-inch middle rolls in the roving frames. All mills in China spin from 10s to 20s, but occasionally spin 42s from American and Indian cottons or American cotton only. We can spin 42s yarn on machinery built for spinning low counts, but of course the finished yarn is inferior compared with that spun on machinery especially built for fine counts. But in truth a Chinese mill manager would be foolish to buy machinery for fine counts when the mill spins such yarn only occasionally—maybe once every few years.

"Wash" says that on a spinning frame "the front roll is never smaller in diameter than one inch, and the second roll ⅞-inch." When writing of Chinese problems he should do so according to Chinese conditions. I say 1-16-inch over the length of the staple is not too much, for we have tried it out and determined that allowance as the best. Let's have the opinions of other readers.

The writer is by no means trying to write more arguments in regard to the third drawing frames and the reduction in speed from 470 to about 330 r.p.m. Most textile experts have agreed both by experience and theory that this is about right, so "Wash" and I should not attempt to argue those points.

As for the trumpets in drawing frames "Wash" says "when metallic rolls are run at a very high speed, a trumpet with a slightly smaller bore should be used." It is not likely that a Chinese mill would keep in stock sizes of trumpets that they don't use very often. But the same size trumpet will work well for different speeds—either 470 or 330 r.p.m.—but not perfectly, just as "Wash" says.

Now a few words in regard to the speeds of the fan and beater. "Wash" may be surprised to hear that in all the mills in China, the speeds of the fan and beater are about the same, the same size pulleys being used for both. For practical purposes, let us call it the same, as there is some variation due to slippage of belts, etc., which may make 10 or 20 r.p.m. difference. In this case the writer has forgotten to mention that the cotton used is 50 per cent Indian cotton of good quality, mixed with 50 per cent of ⅞-inch American cotton. The reader should know that the Chinese and Indian cottons are much heavier than American stock. The writer has seen a Chinese mill using all American cotton, spinning 32s, and the speeds of the fan and the beater were the same. This may be due to atmospheric conditions, but "Wash" can't say it was impossible. If it was impossible, how could a man make it possible? It is possible because the yarn is being spun according to this process.

Any good result obtained may not be due to one cause, but may be due to many causes or a combination of various causes. The writer did not claim the result obtained to be due to any particular cause. But certainly there is no such thing as continued good results being caused by good luck, as "Wash" has intimated. A Chinese.

Finishes for Netting.

EDITOR COTTON:

I am submitting herewith two samples of netting, one finished and the other unfinished. I am having trouble in getting a good firm feel to the netting; in other words, I want a leathery feel at least three times stiffer than sample. I would be much obliged if you could get me a good formula for finishing this netting through the "How Other Men Manage" department. I starch this netting on the padding machine and I have corn starch and glucose to get results. A. R. C. (Wis.)

EDITOR COTTON:

A reply to "A. R. C." could be made more intelligently if he had given more particulars. It is difficult to *permanently* stiffen netting similar to his sample at one run, for instance, because to get it stiff enough at one run the corn starch has to be so very thick that it will not penetrate the closely twisted twine of which the netting is made. It is all on the surface and consequently imparts no stiffening support to the threads. They have no "back-bone," so to speak, and easily, "break down," and corn starch itself, especially when used for heavy sizing, unless handled just right, is more liable than any other starch to break down and become sleazy, though at the same time for other reasons it is the best starch to use.

Corn starch requires thorough cooking in order to insure the proper breaking up of the starch granules, and unless the boiling is prolonged the size will produce a raw feel to the goods and the stiffness will not endure handling and easily break down. An improved method is to add from one-half to one pound of solid *caustic* soda, previously dissolved in a pailful of water, for each 100 pounds of starch; this is added to the starch tub before boiling, and makes the starch more adhesive and smoother and the stiffening properties are greater and more permanent.

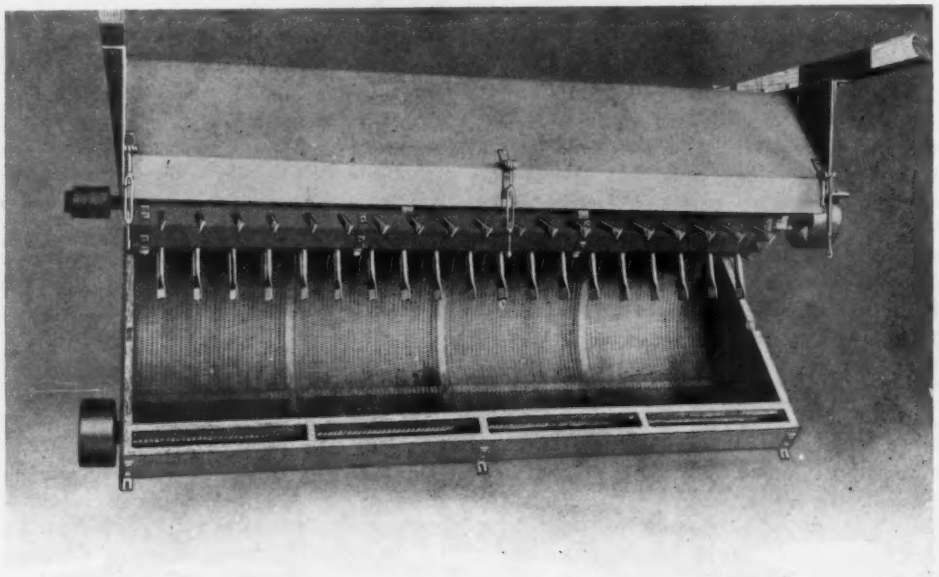
"A. R. C.'s" mode of procedure, I think, should be something like this: For 200 gallons of size: 5 pounds dry caustic soda previously dissolved in a pailful of water. Add this first to the water in the starch tub. Then add 400 pounds of corn starch. Start the agitator and run until the starch is all brought to a smooth milk. Then turn on the steam and boil. *After* the boiling point is reached, boil for one hour, shut off the steam, and add 20 pounds of paraffin, previously melted, and 20 pounds glue previously dissolved in hot water. (Stir well).

The glue, if in sheets, must be soaked in cold water overnight, but I think there is on the market a ground glue flour that can be added to the starch dry, or, at least can be dissolved on the spot without preliminary soaking.

The box of the padder in which "A. R. C." starches his netting must be piped with a closed heating coil of iron pipe (where caustic is used) as the size must be kept hot—but not boiling.

The quantities given are not arbitrary, merely suggestive, but they are based upon actual experience and of course are subject to local conditions, and "A. R. C." must experiment a little, but the theory is this: The starch

COTTON WELL OPENED IS HALF SPUN



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COTTON WELL OPENED IS HALF SPUN

must be adhesive and at the same time thin so that it will penetrate to the center of the threads. Now long boiling with the aid of the caustic soda will accomplish this so he can use a stiffer size and boil it thin. The paraffin gives elasticity or leathery-ness, and the glue, which is quite essential to this class of work, gives stiffness.

It is always best to run such goods twice, a light size the first time and the heavier one the second. I will give herewith one or two foreign recipes for finishing similar goods to "A. R. C.'s" samples:

1. A mixing of 1½ pounds of starch to each gallon of water is first made and boiled for 1 to 1½ hours. The goods are run through this and thoroughly dried. For the second run, to every 150 gallons of the above mixture is added 100 pounds of Epsom salts, 20 pounds of glue and 20 pounds of glucose.

2. Use 150 pounds of starch, boil until gelatinized, and cool to 150 degrees F. Then add: six pounds of diastafor, 20 pounds of glue, five pounds of paraffin, and sufficient water to make 100 gallons. Dry up and run again in same size but with heavier pressure on the mangle rolls.

It will be noted that both of these recipes make their starch thin and penetrating; the first by long boiling and the other by the aid of diastafor.

Another formula used by the lace and corset manufacturers is a good stiffener and might serve "A. R. C.'s" purpose. It goes something like this: 50 pounds of corn starch, boiled with caustic soda (one pound); two pounds of lard; ten pounds of paraffin; 50 gallons of water; and seven gallons of Epsom salt solution 40 degrees Tw. The starch is boiled first in the water and caustic soda and then the lard, the melted paraffin and the Epsom salt solution is thoroughly stirred in.

In conclusion, I would advise "A. R. C." that his efforts must be made along the lines of thin boiling, glue, and twice running of the work. W. B. (Maine.)

How Should Waste be Figured?

EDITOR COTTON:

I have read many articles and discussed with numbers of men the variation in the product from different processes in the mill, particularly those in the card room. The variations are generally spoken of in terms of grains, ounces or pounds. Why not make a practice of writing or speaking of these variations in terms of per cent?

My finished drawing may vary five grains and another man's four, which makes it appear that his is the more even, but if my drawing weighs 75 grains and his weighs 55 grains, he has a greater percentage of variation, and my drawing is the better.

To obtain an accurate comparison between mills using different weight laps, card sliver, drawing, etc., it is necessary to know the hank or weight per yard or to have the variations stated in per cent.

I do not recall having ever read or heard stated a reasonable percentage of variation in the weight of the different processes in the card room. There is one thing, however, that most mill superintendents have agreed upon, and that is the finished lap. We allow one-half pound variation each way from standard, but few of us know the variation *per yard* in our finished lap.

Has it ever occurred to the reader that one pound variation in laps weighing 40 pounds is only 2½ per cent, or probably less than that found on the finished drawing or intermediate speeders? Did you ever stop to think that one ounce variation per yard in a 12-ounce lap is 13⅓ per cent, and is just about the best results obtainable on present-day pickers?

I would like to hear from mills which are now allowing one pound variation in the weight of their finished laps and without making any other change except to see that the picker eveners are working smoothly, allow two pounds variation and then see what difference it makes in the *finished roving.* The ultimate aim of the card room is to make a uniform finished roving, well prepared otherwise.

Crighton openers are properly taking their place in many of our mills and on account of the good work they are doing, there will be many bales of low grade cotton used by mills which formerly used higher grades. But what percentage of foreign matter are they supposed to remove from middling cotton? I have heard this stated from 10 per cent up to 35 per cent, considering all foreign matter removed by the different processes up to and including the licker-in on the card as 100 per cent. If a mill uses middling cotton what percentage of foreign matter are the different processes up to and including the licker-in of the card supposed to remove?

I understand the different processes can be made to remove more or less fiber and foreign matter by different adjustments of the bars, screens, etc. Therefore, if all waste necessary to be removed can be taken out on two processes of pickers, and, at the same time, make an even lap, then the problem of running two or three processes of pickers is solved.

I would like to have these questions answered by COTTON'S readers. Nemo (Ga.)

Character in Cotton.

EDITOR COTTON:

I hope that the young men in New England, and any others who are not familiar with the character of cotton and its fibers, may find a little enlightenment on the subject in this letter; and that they also may learn something of the benefit of well conditioned cotton in the mill.

As a beginner in the mill, it is hard at times to find out these things, which should constitute the true beginning of every learner, as it is so essential to know what is the best raw cotton for a certain product to be manufactured, and why.

I remember, when I was starting my experience in the mill, about all that the overseer or second hand seemed anxious about was to have me learn to set the rolls to the length of staple being run, to card clean, and to keep the counts even—not once did I hear any of them discussing the cotton, whether it was uneven staple, unripe, gin cut, mildewed or tinged, or of its tendency to good work through its characteristics.

I once asked the overseer of the card room if he would show me some unripe cotton some time, and his reply was, "I don't think I ever saw any, as the mill always buys the same kind of cotton all the time." I made up my mind then and there that I would study it out for myself, and will relate briefly my ideas on the subject, as I understand it.

We have for the past year been buying cotton in small

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lots, and a short time ago obtained a lot of 100 bales recently picked, and compressed just one week before we were running it in this northern mill. On opening up the first bales for running, a glace showed that we had a bunch of green cotton to run, not properly aged. Its appearance in bulk was pure white, and in the roving it was hard to distinguish from combed stock, being glossy. It was found to be uneven as to staple, and the fibers lay quite parallel in the bale, making the pulling of the staple a very easy matter. The consequences were that we got uneven counts and breaks on all our frames.

This cotton we call unripe; it was picked early, baled and used too soon afterward in the mill. Cotton picked too early, and not allowed to age, either on the plant or in storage, does not have the same conformation or character in its individual fibers as does well-aged cotton. In cotton properly aged, the fiber become dried out to such an extent that the collapse of its walls is perfect for working to the best of satisfaction, and the convolutions or twists are many. Upon this structure depends the strength of the spun yarn, to a very great extent.

The individual fibers are known as a single cell plant hair, which has one end closed, the other end is attached to a seed. The cell walls are porous, and of no definite structure. In its growth the fiber is round, and cylindrical, containing a central canal which is filled with juices.

During the ripening process, the boll, which is similar to the outer shell of a hickory nut, opens outward, exposing the fibers contained therein to the sun, and air. The juices then begin to dry up, and become deposited in the canal in unequal amounts, unequally in proportion to the amount of exposure, causing thereby an unequal collapse, and contraction of the cell walls, resulting in the twisting of each fiber, which is characteristic of all cotton.

The cell wall is made up of cellulose, a form of starch, and on the outside of the fiber is found a thin wax-like substance, which, in well dried and aged cotton, disappears, allowing for better absorption of moisture in the working.

It is thus seen that in well aged cotton, the exposure to sun and air dries out the fibers, causing the physical condition of each one to take the twisted form so essential to good work throughout all departments in the mill, giving less short fibers insuring evenness, more convolutions insuring strength, and a less waxy surface insuring a good moisture content in the working of the stock.

Why not have some of COTTON'S other contributors, some who have grown up with the staple so to speak, tell us even more about the characteristics of this raw material that we all use and about which we would like to know more. K. (O.)

At a meeting held in Atlanta on October 31, the governing board of the newly formed organization of Georgia textile men adopted "Textile Operating Executives of Georgia" as the name of the organization. By-laws and constitution were submitted and approved.

The committee appointed at the meeting in September is working on the questionnaire to be sent to all the Georgia superintendents, and this will be sent out in the near future. J. W. Hames, superintendent of the Exposition Cotton Mills, Atlanta, is the chairman of the committee which has the carding and spinning questionnaire in hand.

Dimity.

EDITOR COTTON:

In the October issue of COTTON, "Ponco (R. I.)" asks: What is a dimity?

Dimity is a washable cotton fabric which has cord running lengthwise of the cloth. The cord is made by drawing extra warp ends in both heddle and reed as illustrated in the accompanying Figure 1, which is a design, drawing-in draft, and reed plan for a small dimity pattern. Either the plain part of this pattern or the cord can be enlarged by adding more ends. Three ends are generally

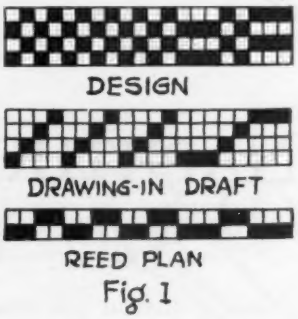


Fig. 1

Fig. 2

used for the cord, but it is possible to use four or five ends if a larger cord is desired. Dimity is always made with a plain weave, but it is often ornamented by printing fancy designs upon the surface of the cloth. Dimity is a light weight fabric and is used extensively for ladies' summer dresses.

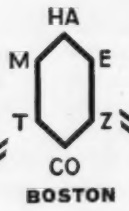
Dimity is often checked and used for making men's summer underwear. The well known "B. V. D." line is a dimity check. Figure 2 shows a design, drawing-in draft, and reed plan for making this class of goods. It is woven on a plain loom by using specially constructed cams. H. (N. C.)

A Stripping Device for Cards With the Flat Direction Reversed.

EDITOR COTTON:

In reference to the letter in the September number from one of your subscribers giving his experience with operating his card flats in the reverse direction, I have been doing this for a number of years, and have found this method to be most satisfactory when utilized in connection with a novel stripping arrangement which I have devised and on which I have applied for patents. I will give a description of this stripping device in this letter, as I believe it will be found very satisfactory when operating cards in the manner indicated.

In the accompanying sketch of this device attached to a card, it will be noted that this stripping device is applied at the opposite end of the card from that on which the stripping comb is usually located. The stripper roll A is rotated by the larger pulley B, which is driven by belt from the regular flat driving pulley C. This stripper roll is covered with fillet whose wires point in a direction similar to that of the wire on the flats. A doffer roll D, provided with fillet having the wires reversely pointed to those of the stripper roll A, is rotated from the roll A by means of the gears 1 and 2, at a speed approximately 20



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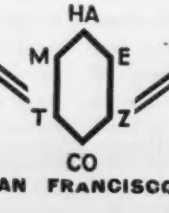

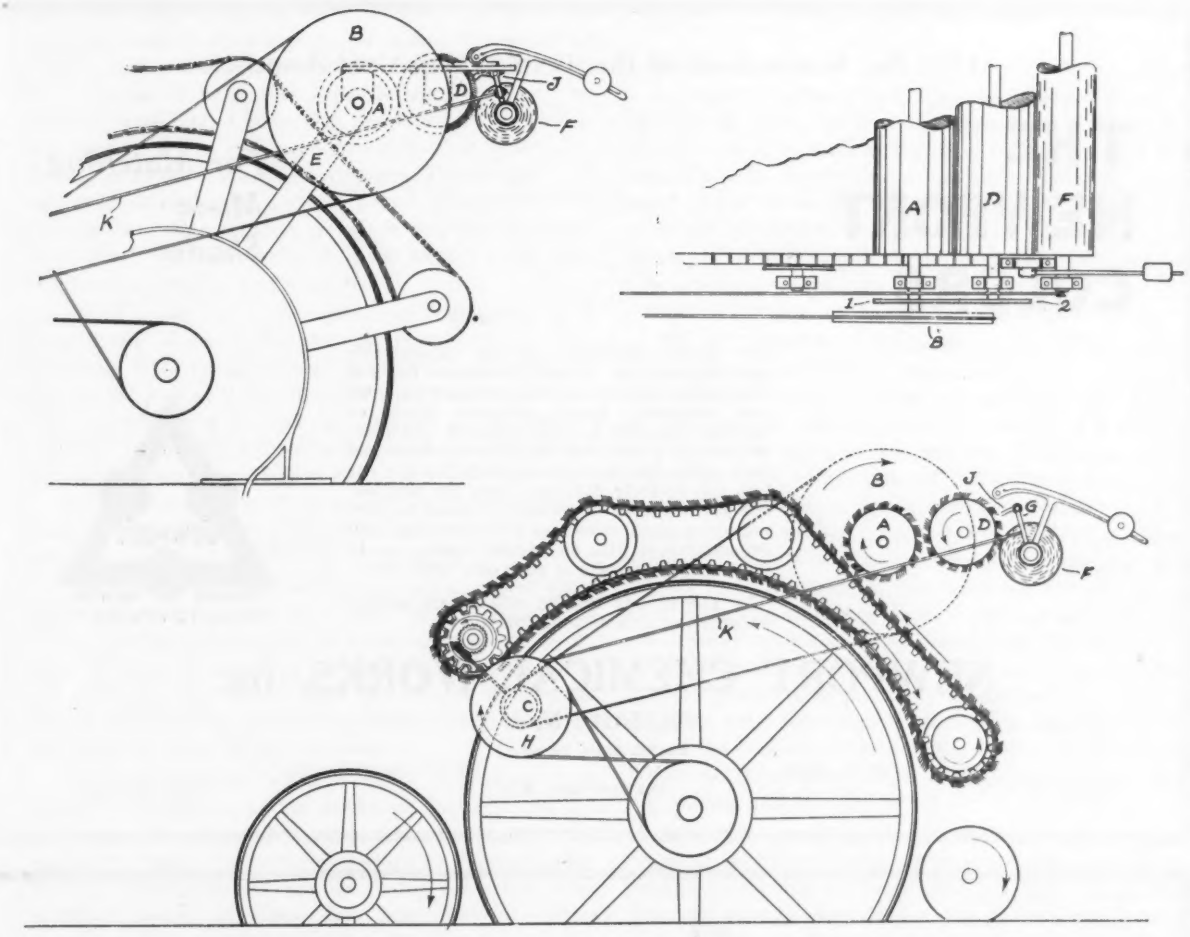

per cent less than that of the stripper roll A, and in the reverse direction. The bearings of these rolls are supported from the body by the bracket E, and are adjustable thereon.

It will be readily seen that, unlike devices for similar purposes, I could not practically operate a stripping comb in connection with the flats or the roll A for the reason that such a comb would only serve to drive the strippings into the fillets, due to the rotation and the angle of the wire. Consequently it is necessary to deposit the strippings upon another roll D, as mentioned. Hence, I obtain the desired relative positions of the strippings, fillet and stripping comb, this relation being such that the strippings approach the comb so that the latter will strike the heel of the wire and knock the strippings off in the same direction in which the wire points.

It will be seen that the material gathered from the cylinder will be removed from the flats onto the roll A and discharged onto roll D, where it is removed and deposited on the roll F by the stripping comb J. This comb is operated by a rod K attached to a lever G which is actuated by a cam on the journal of the pulley H. At the other end the rod is connected to the arm of the comb mechanism.

As clearly appears in the drawing, the clearer roll F is supported by an arm in connection with the counterbalance lever. The bracket serves to support the comb mechanism and the clearer roll.

I would advise that the fillets should be preferably secured to the stripper roll in strips approximately two inches wide, as occasion demands, and that each strip be spaced about ¼ to ½ inch apart, and the fillets on the doffer roll D should be likewise secured. This arrangement of the fillets causes the film of strippings taken from the stripper roll to break, which will permit of its ready removal from the stripper roll and will also deposit the strippings on the clearer roll with much more facility than would be the case if the rolls were equipped with a continuous fillet. If this latter were the case, the strippings would bunch up under the comb, causing a breakage of the machine parts. R. E. C. (Conn.)

Beam Weights and the Weather.

EDITOR COTTON:

What's the matter with "W. T. (Mass.)"? He writes, in the October number, a great deal about something I did not say. In the first paragraph of his letter entitled "Control the Weather" on page 977 of October COTTON, he said that I maintained that it is impossible to keep uniform weights on warp beams in the state of Massachusetts. If the reader will please look up my article in question, on page 615 of the June issue, entitled "It's All Weather," he will find that I made no such statement.

I claim that no matter how properly humidity may be controlled, beams will vary in weight, not in fifteen days, but in fifteen hours. Let the truth survive. The writer has been a carder for many years, also a spinner, and has

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now been a superintendent for many years, but in all my mill experience, I never kept beams so that they would not vary a single pound in fifteen days. Perhaps "W. T." may be surprised to know that even the empty beams vary slightly in weight! I admit that beams can be kept within five pounds, and in some cases to within three pounds, but in both cases these figures are averages. Even when beams are weighing as closely as three pounds many vary from one another. The slightest change in atmospheric conditions added to a slight variation in the number of the yarn will cause a pound or two variation.

"W. T.", like many other men, may find it easy to do a great deal on paper, but perhaps not so easy in actual practice. What he says is very instructive and interesting, but the sad part of it is that all his fine points are knocked sky-high when the windows are opened in the summer months. I hope "W. T." will not come back at me and say that he does not open windows in the mills he works in.

Now stop and think of the amount of variation that is caused by the change in stock, from wiry to fluffy or vice versa, a condition not controlled by humidity.

Think of the unevenness found in sizing almost every day. But I suppose "W. T." is like "W. S."—everything is even, and the beams are on the mark for fifteen or twenty days. Keeping the beams on the mark for fifteen days without variation, and within three pounds for five months sounds to me like the story of the father of our country and the chopping down of the cherry tree.

The up-to-date mill manager wants to produce at all times, if possible, under the conditions found in the fine June days when the work is at its best. Doing this is essentially a matter of artificial moistening of the atmosphere. Various attachments are applied to the cards and other machines because of claims that these different devices strengthen the yarn. I have repeatedly pointed out in this department that any mechanism that will attenuate or give a combing action to the fibers of cotton will weaken them to a certain extent. This statement is proven by an examination of the waste returned to the picker room, it being no longer flexible or coherent.

The effect of humidity in a textile mill is far more complex than appears at first sight, because cotton slightly moistened works more smoothly than when too dry or too wet; the fibers being more flexible and coherent when properly moistened.

Humidifiers are to a mill what the experienced overseer—the one who understands the structure of the fiber and its peculiarities, so as to be able to judge at the time of mixing whether the cotton will lose twist per inch or gain twist per inch—is to a room.

So it can be seen that the right man counts, too. One like "W. S." Wash (R. I.)

Jenkins Brothers, 80 White street, New York City, have announced the appointment of William LeCompte as sales manager in charge of their New York territory. Mr. LeCompte has been a member of the sales organization of this company for a quarter of a century, and has wide experience and knowledge in the engineering contracting and jobbing field.

Wisdom is knowing what to do. Skill is knowing how to do it, and Virtue is doing it.—*David Starr Jordan.*

Practical Comments.

EDITOR COTTON:

In October COTTON "K. C." says he believes "Wash" is right in his statement that better carding can be made with the old style cards and railway heads than with the present system, for the reason that more doublings are secured. I for one cannot see it that way. "K. C." must be on carded yarns, for three processes of picking and two drawing processes are all right for carded work, but, as I have stated before, two processes of picking and one process of drawing are enough for fine combed yarns.

"K. C." refers to doubling more times as his reason for preferring the old style cards and railway heads. On combed work we have the sliver lap machines where we get 20 doublings, the ribbon lap machine with 4 to 6 doublings, and the comber where we get from 6 to 8 doublings, which allows us to do away with all the drawing except one process. I know there are operating executives who will disagree with me on this, but we can't all be of the same opinion. The most even and prettiest yarn I ever saw, with a good breaking strength, was some 60s and 80s peeler yarns made, and still being made, in my state and town with one drawing process and two processes of picking.

Now do not get me wrong on this, for on carded work I would prefer three picking processes and two drawing processes, but with the doublings we get at each lap machine and on the combers, we do not need them on combed work. We are not going to get evenness altogether from our picking, carding and drawing.

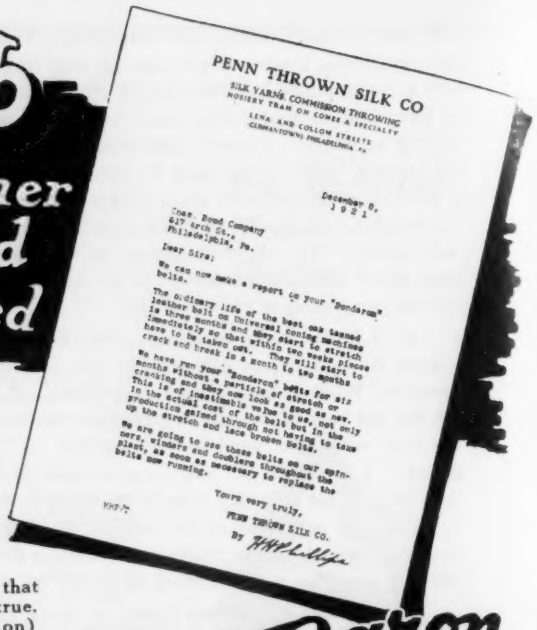
"K. C." has lots of good stuff in his letter for all of us, but when he thinks it takes all those old style machines to produce an even yarn, I can't agree with him. In the first place, we want to start our evenness in the opening room. I have written a number of articles of late on the subject of evenness and so will not go into details about it here. About three or four months ago there appeared in COTTON a letter on what causes uneven yarn, signed "Ted (N. C.)", which discussed the subject at some length.

"K. C." also says he thinks "Tom" is right and "Wash" was wrong when "Tom" says the cotton is combed out at the licker-in. I am of the same opinion as "Wash." I have never been able to see where the cotton got any combing by the licker-in. My way of looking at it is that the licker-in disentangles the fibers in the sheet or lap of cotton and delivers it to the cylinder in loose fibers, which are combed by the top flats. I have been unable so far to see where the fibers got any combing whatever at the card, except between the cylinder and top flats. "K. C." says "if the fibers haven't received a kind of combing action from the licker-in teeth, then I don't know what you could call it." I would call it disentangling the fibers from the sheet of lap so as to deliver the cotton to the cylinder in the manner of loosened up fibers instead of a sheet of cotton to be combed by the flats while being carried around by the cylinder.

I am of the same opinion as "K. C." when he states that most of us will say that they knew all these things; but are we doing all these things? We have got to try to practice what we preach. Careful practice is worth more to us than all the preaching.

I get lots of help reading what other men say, and although we cannot agree on some things, I believe we are

Still on the job long after other cone belts had been scrapped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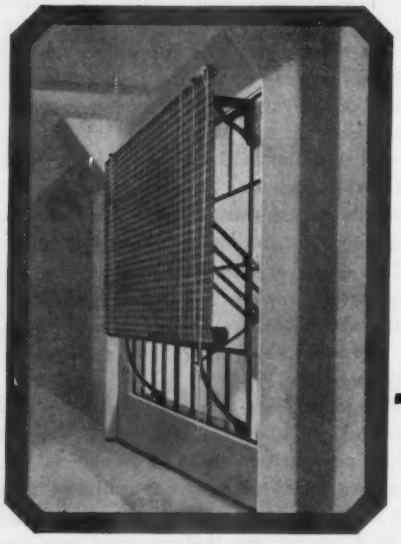

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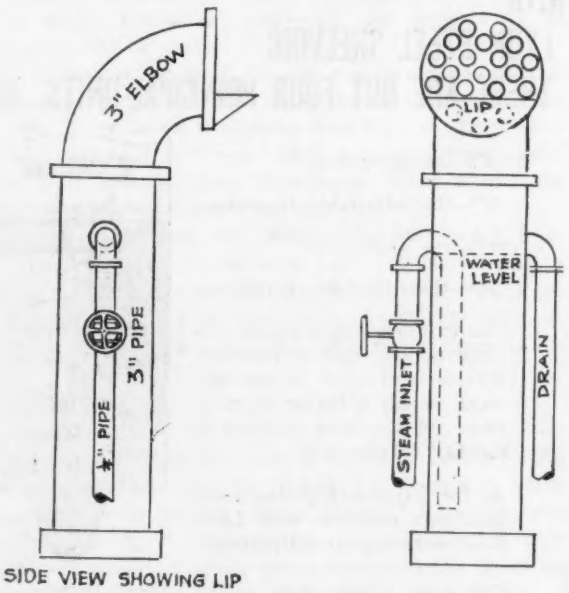
all benefited by the discussions. The mill man who is not a regular reader of COTTON is surely missing a lot of real good stuff from real mill men—for I believe they are all good. Bab (N. C.).

A Static Eliminator.

EDITOR COTTON:

It was the writer's experience to have over one hundred cards on two floors that were almost incapable of being run the first thing in the morning, especially when that morning was cold and dry with a north wind. It made it necessary to take pails and sprinkle water over the floor to increase the humidity to the point where the cards could be run successfully without having the cotton roll up on the doffer. I am sure that every carder has experienced this trouble. The ordinarily sufficient humidifiers in the card room proved totally incapable of coping with the



SIDE VIEW SHOWING LIP

situation, and the remedy was found in a very successful steam pot which gave a steady flow of thoroughly saturated steam into the room in whatever degree wanted.

As soon as these "steam humidifiers" were installed the troubles with the cards vanished, and the answer is found in the accompanying sketch.

The entire apparatus is made of pieces of pipe fittings found around the mill. The main body of the "static eliminator" is made from a piece of three-inch pipe and an elbow for same. The piece of three-inch pipe is cut and threaded at both ends; on one end is fitted a standard three-inch cap as the bottom of the apparatus, and on the other end the three-inch elbow is screwed on. The free end of the elbow is fitted with a cap bored with a number of small holes. At the bottom of this cap is welded or brazed a lip for collecting the water that condenses on the cap and returning it to the main cylinder and preventing it from falling on the floor. The drawing explains the position of the lip, and this lip is made from a piece of pipe which has been shaped with a hacksaw.

The inside of the main cylinder is fitted with two quarter-inch pipes—one opening directly into the side of the three-inch cylinder and acting as a drain to take off surplus condensation. Next is a quarter-inch pipe which runs almost to the bottom of the main cylinder. A valve is cut in outside of this steam inlet to regulate the supply of steam. This may be connected to the heating system of the mill or a direct connection made from the boiler room.

The operation of the apparatus is that steam flows through the steam inlet pipe and the condensation soon fills the main cylinder to the level of the drain connection. So all the steam that passes out through the holes at the top must be passed through the water and become thoroughly saturated with water before entering the room.

The whole arrangement is simple, fool-proof and cheap, and is a deadly enemy of static.

These were also installed in the opening and picking rooms, whereupon we found the laps varied less, more uniform work being made throughout the entire card room due to the conditioning of the opener and picking rooms. Three of these were found sufficient for a large opener room and eight were sufficient for two floors of 136 cards.

James Robertson.

Card Flat Speeds.

EDITOR COTTON:

There has been a great deal of discussion lately about the speed of the card flats, also about running the flats backwards.

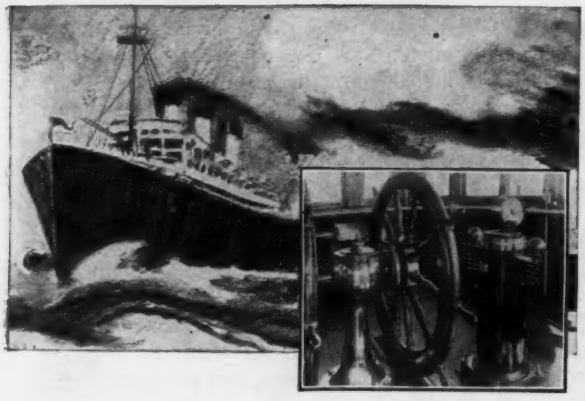
Contributor No. 73 had an article in September COTTON about reversing his flats which he said gave him better work. I will take exception to his argument and say that I cannot see how his work could be made better by reversing the flats, because when the flats get to the back of the card, they are filled with strippings and are ready to be cleaned. When the cylinder takes the fibers of cotton from the licker-in and carries them around, they encounter dirty flats at a time the fibers themselves are dirty. Therefore, they will not be cleaned until they have passed the dirty flats and come to those that are comparatively clean.

How much better the other way is, where the cleaning is begun immediately when the fibers strike the first flats. Of course we will not get anywhere unless we experiment and discuss our experiments, but still it seems to me that the best way to run the flats is forward with the cylinder.

In October COTTON, "G. S. P." asks several questions relative to the speed of the flats. He implies that flats would give better work if they were stationary, but did not fill up so fast with waste. If flats could be kept clean while stationary, there would be no need of revolving flats. Flats were made to revolve so that they could be automatically cleaned instead of cleaned by hand.

In the process of running the flats by power to keep them clean, the makers discovered that the work was benefited because there were at all times a few clean flats where the fibers could be combed before reaching the dirty ones. They experimented and found a speed that gave satisfaction, and when they send out a card the flats are equipped to run at that speed.

However, it is not necessary for us to use the speed they give us just because they say it is right. We must experiment also. In doing so, one man finds that his



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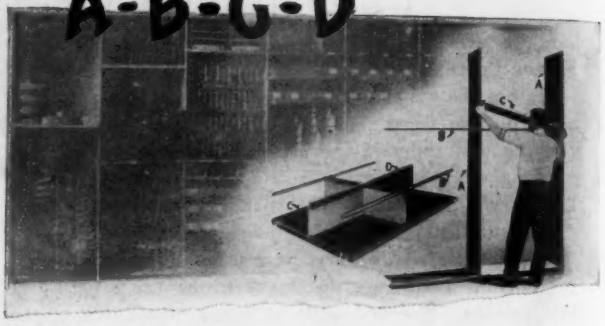

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flats running a little faster gives better work, while another finds that running them a little slower is best, depending upon the cleanliness of the cotton being run. If a dirty cotton is used, it stands to reason the more waste and dirt taken out, the cleaner it will be; therefore, run the flats a little faster. On the other hand, if the cotton is clean and of good staple, the flats need not run so fast because there is not much waste to be taken out.

Personally, I have found that a little faster speed is the best. I had some cards on which the flats were moving 2.75 inches per minute, while others had at one time been speeded up to 4.75 inches per minute. I noticed the difference in the work. The cards whose flats were travelling at the faster speed gave cleaner work with less neps in the web than the slow flats. At the time I did not know it was in the flats. I looked over all the settings and found them the same, but on taking the speeds I found that some flats were moving two inches faster in a minute than others. I speeded up the slower flats with the result that all my cards are now turning out the same quality of work.

In my case, at least, this has proven conclusively that speeding up the flats to a certain extent has benefited my work. I run carded work using from 1⅛ to 1⅜ inch stock, making 10 hank roving and 16 hank roving, which makes 49s warp and 85s filling. The cleaner our work is in the high numbers the better it will run.

Someone may ask, why not speed the flats up still more if you are getting good work now? Wouldn't running them a little faster be still better? I will say that I am getting very good work from my cards with very few neps and I think that the speed they are now running is the most satisfactory to me. G. H. T. (Mass.)

EDITOR COTTON:

I was very much interested in the article asking "What Happens When Card Flat Speeds Are Changed?" which appeared in the October issue of COTTON. By writing this article, "G. S. P. (Mass.)" has proven himself a very practical man, and should let us hear from him again on other discussions.

To my mind, "Mike (Ga.)" is right, and wrong, as the case may be. We must study what takes place in the card. The average speed of the flats is 3¾ inches per minute, and 46½ minutes to make one round. So I hope "G. S. P." will agree with me that if flats are speeded 20 per cent (which would be great) it could not be termed an extreme when the surface velocity of the cylinder is considered, this in most cases being around 2,000 feet per minute.

First, let us assume that the card flats are loaded, so that a little more speed would help. It must be admitted that a great amount of good fiber would be taken out also. Then, we can, instead of speeding the flats, set the front knife plate away from the cylinder, but here too a great amount of fiber is taken out also. It is the law of compesation; you get cleaner work, but the gain is offset by losing good stock. In one case it is a case of profit or loss, pure and simple; in the other case, it is making the yarn or cloth of a higher quality.

However, it must be admitted that speeding the flats will take out more "neps," although it is not a practical method. In such a case I would card slower and pack the back of the card so as to make it as air-tight as possible. I would run a very light sheet of lap and set the feed plate as close to the licker-in as possible without contact. I would also set the mote knives and licker-in screen as close as possible, and set the flats at 10/1000. If the carding was light, and the card not overworked, say turning off 500 pounds in 48 hours, I would set the flats to 5/1000.

As regards increasing the resistance by slowing the flats down, the surface speed of the cylinder should be considered as in the case of speeding the flats, and even though the flats were at a standstill, the amount of resistance could not be noticed, not enough to affect the work, anyhow. Wash (R. I.)

Card Flat Speeds and Neps.

EDITOR COTTON:

"G. S. P. (Mass.)," in the October number, asks what happens when the card flats are speeded up. I also noticed that "Mike (Ga.)" says speed up the flats to take out of neps. I cannot agree with "Mike" on this question at all. I think "G. S. P." is right as to where the combing takes place in the card. There is no combing action at the back of the card. The purpose of the licker-in is to disentangle the fibers and deliver them to the cylinder, to disintegrate the sheet of cotton into a mass of fibers and deliver them to the cylinder in the form of straightened out fibers. Now what are the top flats supposed to do if not to comb out the fibers? To my mind all the combing action that the fibers get throughout the carding process is between the cylinder and the top flats, and the slower we run the top flats the better combed sliver we will get. No matter how long it takes the flats to go around, they will fill so full and no more, and I think for a card of 110 flats, 44 working at a time, a good speed would be 40 or 50 minutes for the 110 flats to make one complete revolution. With this speed I believe we will get the best combing there can be gotten from the flats.

My advice would be to keep the top flats sharp and in good shape so that they will do the very best of combing and at the same time snatch as much foreign matter as they can. We all know that the longer staple we run the more neps we will be troubled with, and the shorter the fibers the less neps we will get.

As "G. S. P." said he would like to see some comment on this from me, among others, I have given him exactly what I think best, adding the advice to keep the flats and cylinder both sharp. Where there are lots of neps in the yarn, I would have the cards stripped four times a day, for the fuller the cylinder gets the more neps that will get by the top flats, and the only place in the entire card to catch these neps is at the top flats. I would get a good setting for the stripping plate, the one that suits best, for where there are plenty of neps in the sliver I believe it a good idea to take out a little more strips at the front; or in other words, at the front of the flats, for if there is any other place in the card to catch these neps I have been unable so far to find it.

I do not see where any man can gain anything by speeding up his flats to try to catch neps. I may be wrong, but until it is proven I am wrong I will still hold on to a slow speed for the top flats with good points on the wire,

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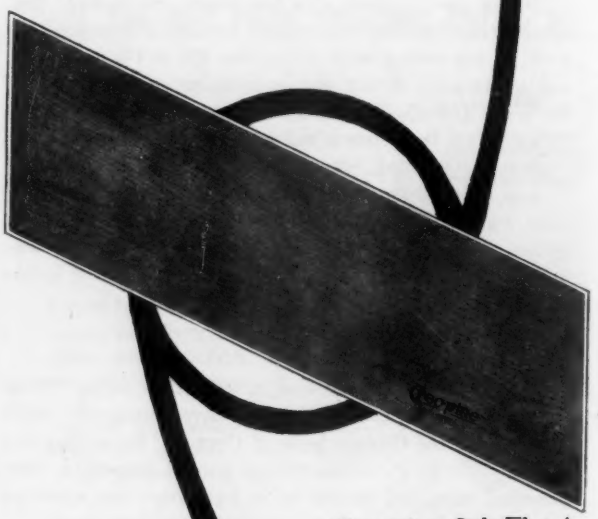

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both flats and cylinder, as sharp as they can be kept. There may be some remedy for these neps, but it is not by speeding up the flats. Bab (N. C.)

The Work—Not The Frame.

EDITOR COTTON:

On reading the articles printed in the "How Other Men Manage" columns, it strikes me that it seems to be a very easy matter for the "old-timers" to favor a certain type of machine or machines or the way things were done when they started in the mill and learned to fix on the machines used in that day; just as easily, in fact, as it is for the later generation to talk on the types of today.

In regard to the flyer-lead and bobbin-lead frame, past and present, the past type may still be used in a few mills but the present seems to be ever with us. The years that have intervened since the vogue of the flyer lead frame have been enough to at least have shown the engineering departments of the cotton machinery builders, as well as agents, superintendents and other operating executives, if the bobbin-lead was more detrimental to the strength of the stock, causing loss of twist, etc., and would have caused such builders to have bettered their frames if they could have done so by returning to the flyer-lead. The popular demand for flyer-lead frames is not yet strong with the majority of mill heads, and this, to me, signifies that the present type must be better, and that the old-timers had better spend their time on facts of today. Why dig into the "ancient ruins" and excavate what was used by those workers of yesterday?

There is no machine in the card room that is a perfect piece of mechanism as regards the working of cotton; not one can overcome the moisture content. We have eveners for weight, based on lap thickness, and sliver weight per yard. This cannot control the moisture. We have the cards to clean and straighten the fibers, take out certain percentages of waste; probably they will one day, but the next, make more or less. This unknown percentage not controlled to a perfect degree of accuracy, causes the variations of weight and yarn count; and the changing of gears at times becomes a matter of good judgment and necessity.

So it is not a hard matter to find a flaw in the bobbin-lead frame, of which the greatest is a perfect tension, which happens on any lead frame. The uneveness of weight per unit of length changes the diameter of the sliver or roving, and on the frame, tension and the diameter of the roving are entirely dependent one upon the other. If the weight per yard stayed exactly on the grains for counts for the entire doff, why then a perfect tension could be obtained, without the least stretching of the roving, on either a bobbin-lead or a flyer-lead frame.

The increasing of the weights causes the diameter of the bobbin to increase, so that the surface speed becomes greater than that of the front roll, and as the cone belt does not work automatically, a tightening of the roving takes place, and the pull on the presser becomes greater, due to the coils around it. The tendency of the increased surface speed is to wind on more roving than is delivered, but this is equally true of the flyer-lead.

If the tension of the roving wound, by either method, becomes tight, the presser pad would then have to be drawn hard against the bobbin, and something would have to give, so the roving which contains only enough twist to allow of the winding onto the bobbin and pull a full bobbin in the creel, gives way up to the time of breaking.

As long as the work could be uniform in count, its entire length, neither flyer or bobbin-lead would be detrimental to the strength of the roving or yarn. There is no greater strain or pull to wrapping a bundle by holding the string in the right hand and the bundle in the left hand and winding the string around the bundle, allowing the string to slip through the fingers at a known speed per minute, than in holding the right hand still and using the bundle to wrap itself by pulling the string through the hand at the same rate of speed.

At this present time of progress, and forward spirit and development, as compared to the years passed by, we have cotton which is badly inferior to the cotton of that time, due to the ravages of the boll weevil and other causes, and any knowledge of the condition of the cotton that has been hard hit raises a question of how one is to handle any kind of a frame perfectly. One day we have 10 or 20 per cent of useless fibers, under staple and weak, and different conditions the next day, and so on. Those working cotton from boll weevil infested areas, who are not having trouble with numbers and breaking strength, tension, etc., are few and far between, particularly those using 7/8 to 1 1/16 inch staple.

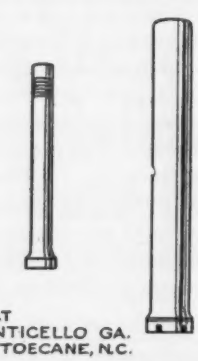
If these conditions do not improve in the next few years you will find that all carders will have to be twice the experts the old-timers were to obtain the results that were obtained several years ago. How many old-timers can figure spooler production by figures, knowing the empty spool diameter, 1 1/21 inch, full spool 4 inches, spindle speed, 800 r. p. m., counts 13s. Question: Pounds per spindle, nine hours, 100 per cent? (Either by arithmetic or algebra.) K. (O.)

Sometimes It's the Spinning Room.

EDITOR COTTON:

Many articles have appeared in COTTON disuessing weak or uneven yarn, and many carders have been trying all kinds of different methods to overcome these troubles. Some have tried cutting out different processes, and resetting the rolls, and many other things too numerous to mention, in order to satisfy the superintendent and the spinner. All ideas seem to be based on the one premise that there must be something wrong in the carding department. I will admit that there are a great many places in this department where uneven work can be produced, owing to the simple fact that there are a number of different machines to put the cotton through. But we must admit that there are other machines in the mill that will produce uneven and weak yarn after it leaves the card room. For instance, how about the spinning department? Are there not things about a spinning machine that will cause weak or uneven yarn? To that question I reply, Yea, and many of them!

Let's start right now and look up a few of the many things that will cause these difficulties. First we will take up the top rollers. They may be either worn, fluted or dry, or choked with waste. New rollers must be put in when needed, and without fail. It is true that it costs something to cover rollers, but it is no economy to use one



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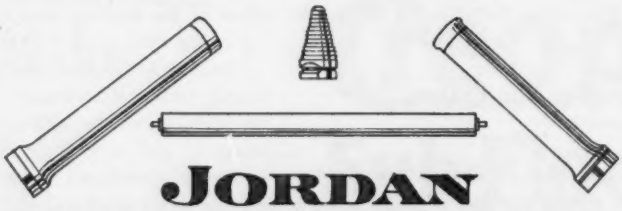

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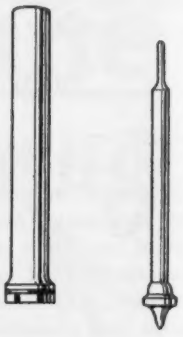

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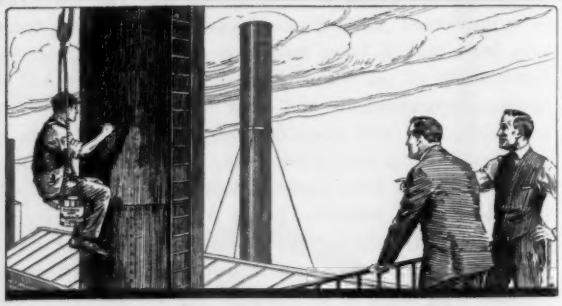

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after it has caused an end to break. They need but little oil. I am sure, in fact, that a great many rollers are spoiled and a great deal of bad work produced from the careless use of oil.

Then we have the spindles. I believe that a large number of spindles are improperly set. Spindles and rings should be set once a year without fail. Then how about the bands? Slack bands cause a great deal of trouble for the spinner as well as for the weaver. The second hand or overseer or both should go over the bands occasionally and see if they are too loose. They need attention, especially after several days of very damp weather, which draws them tight, and when they dry out many are too slack. A worn guide will also make bad work, and the guide should be set while the spindle is running. Rings should be cleaned occasionally. A bad ring is another common fault with our spinning. A bad ring may be used for some time on coarse work, but it will ruin the traveler; besides every time one breaks a weak place is made in the yarn.

Sometimes the gears are set too deeply and cause a vibration. And then again the gears may not be set deeply enough and will slip a tooth occasionally making a cut and very weak place in the yarn.

A spinner may observe all the foregoing points and he will find that his breaking strength will come ever so much nearer to standard if the evils are corrected. Excessive speed will only keep the spinners working harder, and cause undue chafing against the traveler and separator which weakens the yarn. Excessive draft is another fault to be remembered; it will also cause weak yarn. I do not think that the draft should exceed 12 or at the most 13 for double roving.

In general be it said that anything that tends to make the work run badly will weaken the yarn; when an end breaks and is pieced up by the spinner it is very seldom as strong at the splice as at the other points of the yarn, thus causing a weak place.

It is very unfair for the superintendent or spinner to blame the carder entirely for weak or uneven yarn, when in many cases the trouble, or part of the trouble at least, is in the spinning department. So Mr. Spinner should wake up, and look for some of the weak and uneven yarn troubles in his own department. Experience (Conn.)

Asks for Comber Information.

EDITOR COTTON:

I have been thinking for some time of asking you to have some of the good writers who are well up on combing to contribute articles regarding the combing machine, explaining it from A to Z, starting at the floor and taking in everything concerning its erection and setting up; also explaining fully just how to time a comber, what to set and how to set it, what to loosen and what to move, where to loosen it and where to move it to. I for one believe this machine is just as important in the manufacture of high grade yarns as is the carding machine, which is saying a great deal.

I have never seen any articles pertaining to combing, and if we can only get a few of the good men—and I believe they are all good cotton mill men or they could not dish out that good dope we get from month to month in COTTON— to get started on the comber we certainly would get something interesting and something good that will help anyone who would follow them up. If there is an interesting machine in cotton yarn manufacture it is the comber. So come on now and ask the fellows to give us some dope on cotton combing, with every rule for setting, just how to set the nipper knives, the top combs, just how to time the machine all over, how to set the rolls, brushes, half laps, and in full every part to be set, for each length of staple, I know it will make interesting reading for us all. Bab (N. C.)

Differentials and Fly Frame Winding.

EDITOR COTTON:

I notice in the October issue that "Wash (Mass.)" is making inquiry as to the efficiency of different makes of fly frame differentials, and at the same time he points out several little detail differences in the size of gears, speeds, and a general mixture of stuff that does not prove anything logically. However, he would have us believe that these things make the old Houldsworth compound more efficient than the later types. But he goes on to say in another paragraph that this old, or Houldsworth type, could not meet the demands of the bobbin-lead frame, and that the bobbin-lead was such an improvement that rather than give it up, they brought out several new types of compounds.

I had hoped that "Wash" would quit bringing up these little things that do not enter into the fundamental principles of fly frame winding. We should not have to try to establish the truth of our statements by what someone else has said. All the fundamental principles that enter into fly frame winding have been proven long ago by the results obtained.

In practically all the fly frames now running in the South, the bobbins are driven up to spindle speed without the assistance of the compound or differential. That is, if the sun gear stands still while the frame is running, the spindles and bobbins will revolve at the same speed. Thus it will be seen that all that is required of the differential, cone belt, cones, etc., is to furnish enough power at a variable speed to wind the roving on the bobbin.

"Wash" says that the sun gear on the old style has 120 teeth, while the new styles have only 30 teeth, in their sun gear. This does not prove anything. He should have gone further and proved the truth of his statement. For if he had tried turning this large sun gear one complete revolution, while the frame was standing, he would have found that this one revolution turned the bobbins more than six revolutions. Applying this same test on the small sun gear, he will find that the spindles turn less than one revolution for each complete revolution of the small sun gear. Therefore, if we would multiply the small gear by only six it would show a relative size of 180 teeth, as compared with the 120 teeth. I mention this, or rather make this comparison, to show there is nothing to such claims as he has set forth.

There really is but one factor, to be considered in the efficiency of a differential; that of the power required to drive it. And before we could answer this, each compound in question would have to be figured for its velocity, pounds of journal friction, and to this added the loss caused

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New York

through the gear teeth.

We should not become unduly excited over the efficiency of differentials, for you can find all the various types in different mills over the country that are producing first-class results.

"Wash" says that the high compound sleeve journal speed, together with the bobbin-lead, put the old style out of business. It is not out of business. There are hundreds of them installed each year, giving entire satisfaction on the bobbin-lead frame.

In the past, cone belts have been treated so badly that a great many mill men are always anticipating trouble with their winding. We have already shown that the cone belt has only to do the winding, which in the average case is not more than one-tenth of the total speed of the bobbins, or, in other words, the power required to be furnished by the cone belt is not more than one-tenth of that required to drive the bobbins alone, leaving the spindles out altogether.

Taking an average frame, the cone belt at its highest speed is one-fifth as fast as the main belt, and, if in the same condition, will deliver one-fifth as much power as the main belt. While it does not have one-tenth as much work to do as the main belt.

There is one point we might well consider: that of keeping the different compounds in repair. Some of them are all boxed up in casings in such a manner that it is almost impossible for the average mill mechanic, with his meager equipment, to repair them. And yet a lot of superintendents are so hide-bound that they won't have their mechanic trim up these old compounds so they can see how to refit them and properly set them up. I heard this story back in the "nineties": Two mill supply men were discussing the intelligence of a certain mill superintendent, and one said to the other, "Why, man, do you know that Mr. So-and-so can take a speeder compound all apart, lay it down in a pile, and then put it back together again?"

Notwithstanding "Wash's" hoo-doos on the fly frame in regard to winding, or the fact that many of the men connected with the building of fly frames have told us many mysterious things about the problems of cone outlines, winding, and so on, there no longer should remain any mystery in the whole matter. There is no question but that the pioneers believed many of the theories given us by "Wash," and they worked to that end, finally making an equipment that would wind very satisfactorily.

Today there are frame builders making frames any size or length called for, yet they only make one size of cones. They are used all through England by the finest yarn makers in the world; also in this country.

In conclusion, I will say that I am sure that I have not answered "Wash's" questions in a way satisfactory to him, for a lot of what he has said is so stated that no one could answer it. "Wash" said that on some fly frames, the friction was so great that a dog was necessary to hold the bottom cone while doffing owing to the fact that when the bottom cone backs it makes a mess. This is evidence of less friction, rather than more friction, for if the cone belt being slacked on the bottom cone permits the out-of-balance weight of the carriage to drive back through the differential to the bottom cone on one differential and not on another, all other things about the frame being equal, it certainly shows less friction in the one backing, than in the one that does not back. If those who are having the trouble "Wash" is talking about will properly balance the carriage, that

trouble will be over. This is another instance of not proving the case, by going to the bottom of the matter. There must be a lot of old junk in Massachusetts that has not yet been thrown away, or "Wash" would not have had so many bad dreams about fly frames. The writer worked in a mill once that had one fly frame, among others, that seemed to have mule characteristics. It would run for days showing no signs of trouble, and then, all in a moment, it would reverse the carriage in the middle of the traverse and go the other way, and if a certain man was away, or out sick, or at church, it was out of commission until he got back on the job again.

But those days are past—down in Dixie.

K. S. (N. C.)

Standard Room Cost.

EDITOR COTTON:

The average overseer has his own peculiarities, he wants to have his room clean and the machinery in full operation, the help satisfied, and the management approving. Rarely is he deeply interested in the question of cost, if it means the loss of any of the above advantages, that are to him so evident. His work is easier when all the things in the department are going along without friction, and each day has its own compensations.

Again this devotion to cost alone makes for frictin with the help. They feel that he is a pusher, a driver, and a very hard man to satisfy. The management feels that any reductin in cost of operation means a step toward success, but the foremen are sometimes slow to follow their attitude.

In this difficulty, there is one way that can bring the two parties into more satisfactory agreement, namely, have the cost of the room a standard amount. If the number of yarns spun or the kind of cloth is constant, have the amount that the room should require for labor cost to produce the average required product one that is fixed. Whatever the amount determined for the product turned out, have it fixed. The carding to be rated at so many dollars and cents, and the spinning, and the weaving also a standard amount.

When the work is changed the rate for the room must change, but while it is the same, the amount must be the same. That is the figure that will be allowed on the payroll for the department. To produde this result, the overseer must work his costs on each operation, so that they meet the standard amount. If he is short of help to cover one job, as sweeping, and has a surplus on the doffing, the hands must be so arranged to make the total for every kind of work agree with the standard figure.

When, for any cause whatever, the amount that is turned in for the week is over that figure, the reason must be stated on a separate report sheet, and, if the amount is less than the standard, the amount, in red ink, so credited to the room, must also be explained. In this way the rivalry between the rooms is made constant, the pride that each foreman has in regularly turning in a credit sheet is fostered, and the average cost of the department and the plant is secured.

This should always be put on the low side, as any increase in the amount that would enable the overseer to have a reserve fund to fill up shortages, would result in its always being the amount of the weekly payroll. Standards should be kept ahead of changes in the style of work. If the numbers of the yarn are to be altered make the figures of standard cost ready for consultation, thus insuring the adoption of the new total cost, when the work has been altered and the new styles are in the department.

The use of this method of making a cost standard, and the details to make it applicable to plants on various work call for special determinations that each concern must figure for itself.

This brings up a peculiar experience that comes to us in a plant that was running on odd goods, as well as some standard makes that had built up the concern in the first place. These standard grey goods, although a regular market product, had for some time been unable to compete with the makes of other similar mills. Either they ran their looms on a better arranged schedule, or their looms were better adapted to the requirements of the market, or something. Anyway, the plain goods were always a sore spot on a cost sheet whenever it was made up for the treasurer.

At the close of this particular period, the memorandum figures were presented, the figures that had been made up with all the care possible so as not to throw any special item on the plain goods when it was really called for by fancy goods. As soon as they were received the treasurer 'phoned the plant, "There must be some mistake on the plain goods," he said, and was not satisfied with our reply that there was no item that belonged anywhere else included in their schedules. However, at this suggestion, the whole schedule was again taken up, and the decision as to which should have this cost and which should have that subjected to a new consideration. A good many hours were expended and all the figures changed, but the result was not in the least satisfactory, With all allowances, and the most liberal use of any and every item that could be given to the odd goods, the old standard grey goods were not changed an eighth of a cent in the cost per yard as determined in the first schedule. The figures of the amount used in that period were certain and no ingenuity could so marshall them so as to make the production of the standard goods profitable.

This brings out the basic point in cost. There are certain fixed overheads that are the same no matter what kind of product the plant turns out. If those are too high no ingenuity can reduce the cost of the goods woven to the market standard of sale price and include a profit for the plant. The changes in methods and the improvements in machinery are the items that determine for what the goods will sell.

When the time comes that the output of the factory can not meet the current quotations for goods, severe methods must be used. A rising market is always a pleasure, and the returns that such operations bring are very welcome. But when the tide turns, then a surgeon is needed, not the family physician. Something that has prevented a healthy profit must be cut out or the concern will falter and fall by the wayside and its competitors will reap the benefit.

Never let the cost of a yard of goods, or of a pound of yarn fail to reach the low average of those who are in the same market and when the time comes to make the changes needed, do not hesitate, rather lead the procession.

A. H. G. (Conn.)

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"Wash" Finds Some Heavy Drawing Sliver.

EDITOR COTTON:

It is regretful that recently some of the contributors to this department are throwing boquets at themselves. An even sheet of lap or an even sliver or yarn is impossible, so why claim that it can be done?

It was not so long ago that I made the claim that the bobbin-lead system was the chief cause of our troubles. One writer claimed it was my trouble. But like "K. C." and many more, they put a question or two every little while that condemns the bobbin-lead system. They do this unconsciously, of course, nevertheless they spring their own trap.

The boys will remember how many contributors jumped on me when I made this claim, but it will not be long before any practical man will be ashamed to defend the bobbin-lead system.

Some will claim they are puzzled and at the same time claim I am dead wrong and they then will ask such questions as: "We are unable to understand how such a high front roll speed was maintained." or "Is there more twist in the back row of spindles than in the front row?" or "What makes a set of fly frame roving run out so unevenly at the next process?" These are some of the many questions that have been put in the columns of this department not long since; they have been answered many times, too, but have not been understood, for if they had been, we would have few contributors defending the bobbin-lead system.

We stop a fly frame, and turn back any bobbin gear ½ turn so as to cause slack; then we start the frame again and the slack is taken up immediately. This proves that there is stretch taking place at all times, on any bobbin-lead fly frame. In other words, we have a draft between the drawing rolls and the surface of the bobbin. The length of the roving depends on the condition of the drawing rolls, the way they are set, the attention they receive and also the speed at which they are run also play an important part in making a variation in the length of roving wound in the bobbins.

Then we have the variation in the sliver before it enters the drawing rolls, but, as stated, what causes the chief trouble is the stretch or draft that takes place between the drawing rolls and bobbin on all bobbin-lead fly frames. Even in fine goods mills a slight variation is found, but it is not as great as in a cotton mill where short stock is used. For the reason that when the stock is longer than the distance from the eye of the paddle to the surface of the bobbin, the roving is stronger than the increasing diameter of the bobbin, which helps to hold conditions more equal.

Now, let us take up the claim of the long draft boys that by reducing the feed roll, they make the work much stronger. But when a test is made, is it made from the same bale of cotton and under the same conditions?

I am in the state of Rhode Island, and I find mills in this state that run a 75 to 80 grain finished drawing sliver. Just think of it. The carder said that the work did not run very well in the spinning room, owing to the stock being so dirty. I told him not to blame the stock too much, but to be grateful that he had not been fired. In another mill I found where the carder knew as much about setting metallic rolls as the long draft boys know about what wears the teeth on each end of the licker-in.

I wonder if I will have the pleasure of meeting "A. B. C." and "S. A. F." I hope so. Wash (R. I.)

Why the Other Fellow Gets the Job.

EDITOR COTTON:

When you see a person getting ahead much faster than you are, do not fool yourself by saying the other fellow is lucky or that he is a pet with the boss. Get right down to business and look for the real cause and very likely you will find that the other fellow is doing things that you do not do—things that you do not consider belong to the job.

And very likely you will find that he is willing to at any time deny himself of little personal pleasures to be sure that his task is finished before he leaves it.

Maybe you will notice too that he retires before you come in from the barber shop, drug store or some other loafing place, and you will also notice he is up and gone to his work next morning before you thought it was time to get up.

Just get right down and take stock of yourself fairly and squarely and you will find a lot of weak spots in your system which you could improve. What a blessing it would be if we could really "see ourselves as others see us." If this were possible some of the fellows that cannot understand why the other fellow always gets the best job could see plainly enough why it is. The trouble with most of us is that we take up so much time pointing out the other fellow's faults that we have no time left in which to see our own.

So often it is that some little thing we do not think amounts to much is the very cause of not getting promoted. I know an employer who had to discharge one of his most faithful and hard working employees because he just simply couldn't get to his work on time. He was willing to work overtime to make up for being late, but that did not suit his employer, because he could not allow one man to be late and not allow the others to be late also. So, after trying every scheme he could think of and not being able to get this man to be on time, the employer was compelled to let him quit.

The habit of coming to work a little late has kept many a young man from being promoted. If a person gets in the habit of being a little late, it seems almost impossible to bring things about in the morning so as to be on time. The only thing to do if you are a victim of this bad habit, is to make an iron resolution to always be a little ahead of time, and you will soon find out that you feel much better by doing so. Good business men are always very prompt and have no patience with the "always lates."

Another reason why the other fellow gets the job is that he studies his work and takes every advantage to learn the details as to why things are done in a certain way, so when asked a question about some part of the business he is ready to give an answer quickly and show that he knows something about the job he is on and is not merely running it like a parrot learns to talk. You can teach a parrot to say "damn" but he doesn't know what it means. When the man over you asks you something about the work, he can soon tell whether you are making a study of it or not, and it is nothing but natural that he will look more favorably on

the young man who can answer him intelligently and quickly.

Many young men who wonder why they are not promoted would be surprised if they were told that it is because of selfishness. Some people always want their own way and are always bragging about what they have done and can do. They are not generally very popular.

Some people with good education, ability and valuable experience wonder why the other fellow that never finished high school passes by them. However, it is often due to some disagreeable habit they have. Many people lose their chance of promotion by grumbling about doing something which did not strictly belong to the job or work and which they thought belonged to somebody else. If there is anything an employer despises, it is a grumbler, a growler, a kicker.

If you want to "beat the other fellow," do your work so well, know so much more about it and be so pleasant about it that when a vacancy occurs there is nothing for the employer to do but move you up.

If I were asked to tell the one quality most desirable in an employee, I would not hesitate to say *"Loyalty."* A man will put up with all sorts of weaknesses, he will overlook blunders and sometimes costly errors if he knows you are loyal to him and to your job.

You can't be loyal to a man's face and knock him and the job to his back, and expect to fool him. Just ask any man who is working 100 or more hands who the fellows are that do the knocking and the grumbling and he will call their names out to you without having to look at the books, because he knows them, every one of them, and the strange thing about it is that these knockers do not think the employer ever hears anything about it. Such fools! No matter how well you do your work or how valuable you have made yourself to the firm, if you lack loyalty, you seem to lack everything.

Loyalty is the very foundation of character.

Aspirants for promotion take heed.

Superintendent (S. C.)

Uneven Kier Boiling.

EDITOR COTTON:

In your October issue was an inquiry from "J. C. (N. Y.)" relative to boiling raw cotton, and the troubles he is having in obtaining even boils. In the first place, he is not using enough liquor. For three tons of raw cotton, 2,250 gallons total volume in the kier is necessary for complete saturation and circulation. Of all materials, raw cotton is considered to be the most difficult to boil out thoroughly and evenly. If raw cotton could be run through squeeze rollers and thoroughly saturated with water, it would simplify matters a great deal, but unfortunately this is almost impossible. Consequently it is put in the kier dry and occasionally while being loaded in the kier it is wet by spraying water over it. Then when in the kier it packs down hard and presents serious resistance to the liquor.

For the stock "J. C." mentions a highly concentrated liquor is necessary and one that has in it a material of great penetrating and solvent qualities. S. T. W. (N. Y.)

The best way to get up in the world is to get down to business.

Circumstances Alter Cases.

EDITOR COTTON:

I see in the October issue that "Wash" is coming back at me in his letter entitled "An Opinion on Management." He says I must have forgotten the war is over. Not at all. I know times have changed and wages are not as good as they were during the war, but still that hasn't a thing to do with my argument in regard to paying just a little better wages than the average mill. Why is it that mills that do that very thing will have more contented workers than the other mill on the same class of work? Why? Because they get the cream of the help and thereby get the cream of quality and quantity.

"Wash" also asks me the question "What business has the superintendent got going to the help? Why does he not go to the overseer about anything that has gone wrong?" Well, what would "Wash" do if he was superintendent of a small mill where the superintendent was the whole cheese—superintendent, carder and spinner combined? I have seen that very thing, and I am a younger man than "Wash," or think so at least, judging by what he says of his mill experience.

I did not mean that we should pay war prices; we can still live up to my argument and not pay war prices. And I am not answering "Wash" in particular—what I believe I believe and will believe until it is proven that I am wrong. "Wash" is a good writer, and, I believe, an A No. 1 mill man, but that old saying holds good anywhere, in any climate—"No man is perfect in all things or in any one thing." I hope "Wash" will tell us if he never saw a mill where the superintendent was overseer of both rooms. Why I even know a mill where the superintendent has to do his own grinding and also work as second hand in spinning. Also if he has never heard of some mills paying just a little better wage than others in the same territory on the same class of work? If so, what kind of work did each mill turn out in quality and quantity?

Ted (N. C.)

Because of the present tense political situation in Asia Minor, and along the Dardanelles, a new commercial map of the Near East just issued by the Irving National Bank of New York possesses unusual interest. The map embraces southeastern Europe, including the Balkan countries and southern Russia, Egypt, and Asia as far eastward as the border of India, and locations hazy in the mind of the average American are clearly shown. The territorial boundaries given are those fixed by the various peace treaties between the Entente Allies and the countries in the former Austro-Germanic coalition.

This map also is a travel and shipping guide, and it gives a graphic summary of this region's natural resources and trade possibilities. All the principal steamer routes, harbors, commercial centers, railroads, etc., are shown, with other information of commercial value and interest.

The American Aniline Products, Inc., has acquired control of the American Vat Color Company of Chicago, and has reorganized it under the name of the American Vat Color Mfg. Co., with main offices at 80 Fifth avenue, New York City. They are manufacturing Algol and Indanthrene colors.

KNITTING SECTION

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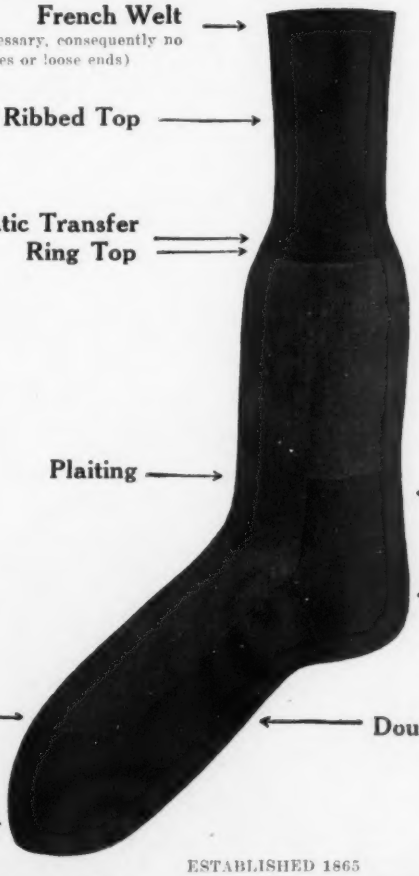

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DEPOTS AND OFFICES AT MANCHESTER AND PARIS

Sodium Sulphide

BY A. J. HALL, B. Sc.*

An examination of the various reports on the consumption of dyestuffs will show that sulphur dyes are in big demand. This popularity is due to their cheapness, fastness, and ease of application. Up to the present time, in spite of numerous attempts, no one has succeeded in producing a satisfactory substitute for sodium sulphide, and it is universally used in the application of sulphur colors. Ammonium sulphide is certainly better in all respects, but it is expensive and difficult to obtain in quantity. Sodium sulphide has, therefore, attained a growing importance in the dyeing industry.

The manufacture of sodium sulphide involves no complicated chemical reactions, but it nevertheless is one of considerable difficulty. Successful manufacture comes of experience, so that the number of firms who make this product is restricted. A fusion process has to be carried out, and it is of a very destructive nature. Molten sodium sulphide will rapidly eat away a furnace lining, and this is one of the chief difficulties encountered. The exact conditions of manufacture vary at different works, but the variations are chiefly due to the construction of the furnaces which depends on circumstances and experience. Sodium sulphide is produced by the reduction of sodium sulphate with carbon. These materials are obviously cheap. The sodium sulphate is obtained as an intermediate in the manufacture of soda ash, and is known as salt-cake. Coke breeze from the gas works is a cheap source of carbon.

In general, some two parts of salt-cake and one part of coke breeze are well mixed and introduced into the furnace. The mixture is gradually brought to fusion point, when a reaction takes place which is approximately represented by the equation:

$$Na_2SO_4 + 2C = Na_2S + 2CO_2.$$

Some of the carbon dioxide will be reduced by the coke to form carbon monoxide (CO), and in consequence a mixture of these two gases will always be present. The gases have an important function, since they tend to maintain the fusion mixture in a porous condition, and the heating has so to be regulated that this porosity is not lost. If the sodium sulphide melt be over fused, it subsequently sets as hard as rock, and has to be dug out of the furnace. In the normal process the fused product is run out into shallow containers and allowed to set. It is then broken up.

Crude sodium sulphide, as obtained at this stage of the manufacture, is tolerably pure. A certain amount of sodium carbonate and carbon is present, and to remove these the broken lumps are dissolved in water and the sodium sulphide is crystallized out. In many cases a product richer in sodium sulphide is obtained by boiling the solution till the temperature of the liquid rises to about 160 deg. C., and then running it into iron drums, where it sets to a solid. It will thus be seen that the production of sodium sulphide is similar in many respects to that of sodium carbonate and caustic soda.

When perfectly pure the crystals of sodium sulphide are colorless. In commerce, however, they are colored yellow or light brown. Their composition is indicated by the formula $Na_2S.\ 9H_2O$. Sodium sulphide crystals contain 30 to 32 per cent by weight of sodium sulphide. Solid sodium sulphide, or, as it is generally called, sodium sulphide conc., contains about 60 per cent by weight of sodium sulphide. An examination of the prices of these two varieties will show the sodium sulphide conc. to be the cheaper. The crystals, however, are more easily dissolved.

Both forms of sodium sulphide are reasonably pure and, from the dyer's standpoint, neither has an advantage over the other in this respect. The following analysis may serve to show both the purity and the composition of an ordinary sample of sodium sulphide conc.

Sodium sulphide (Na_2S)	=	62.8 %
Sodium thiosulphate ($Na_2S_2O_3$)	=	2.9 %
Sodium sulphate (Na_2SO_4)	=	1.1 %
Sodium chloride NaCl)	=	1.7 %
Iron oxide (Fe_2O_3)	=	.44 %
Water	=	31.06 %
		100.00 %

It will be noticed that the impurities are chiefly bodies formed by the oxidation of sodium sulphide. This fact will be referred to later.

Sodium sulphide is used both in the manufacture and in the application of sulphur dyes. The solution is a valuable solvent for sulphur and sulphur compounds. Moreover, it has strong reducing properties. The amount of sulphur that a solution of sodium sulphide will dissolve is surprisingly large—it can amount to nearly twice the weight of the sodium sulphide used.

In the manufacture of sulphur dyestuffs, nitro compounds such as dinitrophenol and dinitro-chlor-benzol are treated for several hours with a solution of sodium sulphide containing a suitable amount of sulphur. Alternately the reacting substances are introduced into molten sodium sulphide and polysulphides.

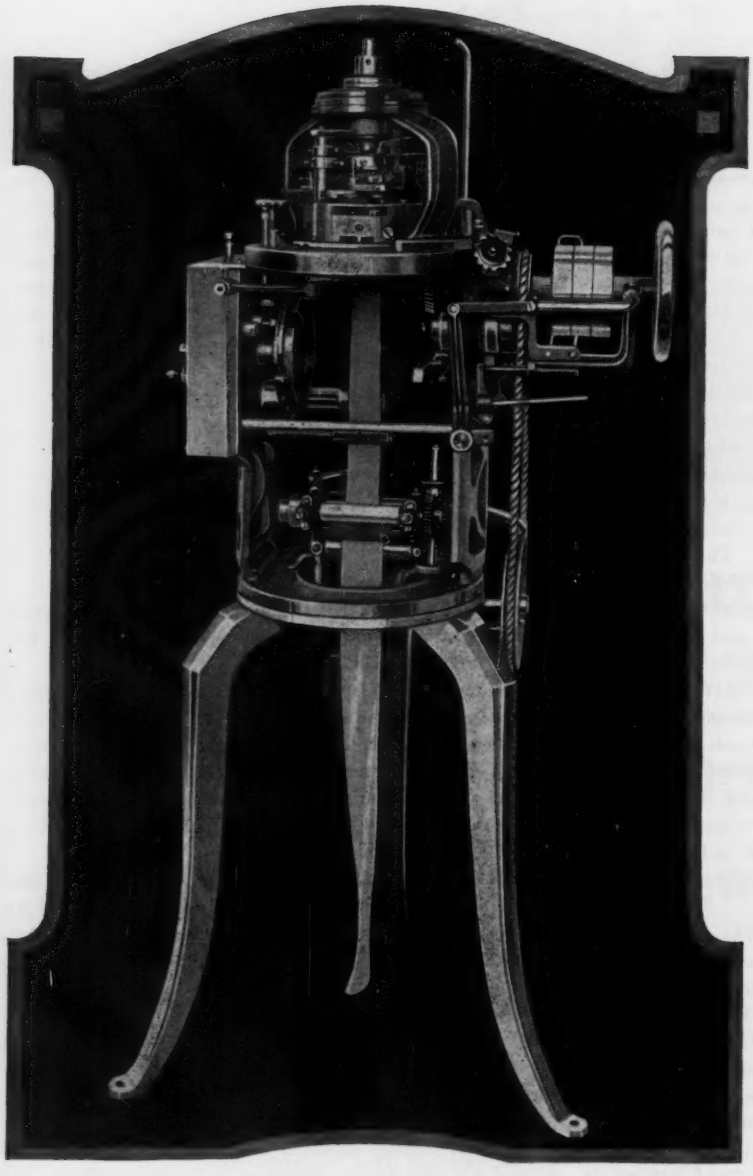
Owing to the difficulties attending the control of a fusion process, it is replaced wherever possible by the prolonged digestion method. In either method the product is dissolved in water, air is blown through the solution, the dyestuff is thereby oxidized and precipitated and finally filtered off and dried. Everyone is familiar with the fact that solutions of sodium sulphide tend to decompose and deposit sulphur when exposed to the air. Consequently, it will be seen that sulphur dyestuffs cannot be manufactured free from sulphur.

In the digestion, some of the sodium sulphide is oxidized to sodium sulphite, which further reacts with the sulphur present to form sodium theosulphate. The waste liquors obtained after the precipitation of the dyestuff can be used as a source of sodium thiosulphate. At one time these liquors were discharged into the drain, but now they are generally worked up for the sodium thiosulphate, which can be obtained pure, by several crystallizations.

The use of sodium sulphide in the application of the sulphur colors is important. For cotton dyeing it is satisfactory in every way, but many attempts have been made to replace it in wool dyeing.

A solution of sodium sulphide reacts strongly alkaline.

*In The Dyer and Calico Printer.



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Conditions call for economy in production and quality in product. This demands among other things, highest mechanical efficiency of your machines.

The Wildman Ribbing Machine does its share by speeding up your production and turning out better tops.

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TRADE MFG MARK

WILDMAN MFG. CO.
NORRISTOWN, PA.

It is in fact almost equal to a similar solution of caustic soda, since it is so readily hydrolyzed according to the following equation:

$$Na_2S + H_2O = NaSH + NaOH.$$

Wool being so susceptible to alkalies, cannot be satisfactorily dyed with sulphur colors by the usual methods. It can be dyed, however, very well by dissolving the sulphur color in a solution of ammonium sulphide and using this dye liquor at about 60 to 70 deg. C. At present, however, the supply of this substance is restricted, and the dyeing method becomes costly.

In the Lodge-Evans process this difficulty is overcome by forming ammonium sulphide in the dye liquor from sodium sulphide and ammonium sulphate. The results obtained by this method are not so satisfactory as those obtained when ammonium sulphide itself is used. The Lodge-Evans process, however, represents the most successful attempt yet made to replace sodium sulphide in dyeing with sulphur colors.

The methods by which cotton is dyed with sulphur colors are generally taken as being beyond consideration. Everyone knows that 1 lb. of color requires 1 lb. of sodium sulphide to bring it into solution. This fact is certainly useful, but it rests on no scientific foundation. It is not a law. Anyone who has had experience in the manufacture of sulphur dyestuffs knows the difficulties which prevent successive batches of color from being identical in composition. The shade of the finished product can be ultimately made correct, but in no way does the dyestuff contain a constant proportion of impurities such as free sulphur. If the same manufacturer cannot accurately control the production of a sulphur dyestuff, it will be obvious that products from various makers will differ considerably.

Dyers would do well if periodically they made experiments with the various brands of sulphur colors which they use. There is no doubt that the text-book instructions indicating the use of equal weights of dyestuffs and sodium sulphide would be found capable of variation with advantage.

But is there such a thing as "the correct amount" of sodium sulphide which is required? Surely the proportions of dyestuff and sodium sulphide depend on the mode of dyeing and the objects in view.

A sulphur dye is insoluble in water or alkaline solutions when it is in the oxidized condition. By using a certain minimum amount of sodium sulphide a given quantity of dye can be reduced to a leuco state, and it then is perfectly soluble. If a solution made in this way were then exposed to the air, a certain amount of oxygen would be absorbed. This oxygen would oxidize its equivalent of the dyestuff which would then be precipitated. Obviously such a solution could not be very satisfactorily used in jig dyeing—it would be too unstable.

In practice, therefore, an excess of sodium sulphide is necessary in order to allow for irregular aerial oxidation. It is a factor of safety. The amount of the excess will depend on the method of dyeing, or rather on the extent to which aerial oxidation of the dye liquor can take place. A greater proportion of sodium sulphide will be required when the dyeing is performed in the jig than when a continuous process is used.

The degree of exhaustion of a sulphur dye bath depends on the relative amount of sodium sulphide present. It is obvious that greater exhaustion is obtained with a dye liquor deficient in sodium sulphide.

Before the war the practice of using equal weights of color and sodium sulphide was generally sound. With present-day dyestuffs it can be varied often with advantage. A particular form of the dyeing process may also render the practice open to change.

The storage of sodium sulphide is troublesome. The substance is generally delivered in casks or tins, and often it has to lie about over prolonged periods in these opened containers. In contact with air the sodium sulphide rapidly oxidizes and deteriorates. If kept near acid fumes it soon begins to evolve sulphuretted hydrogen. Usually the opened casks of sodium sulphide are covered with one or two canvas bags. This procedure is useless except in so far as it relieves someone's conscience. In view of this there can be no doubt that the best way of storing sodium sulphide is to dissolve it. Each barrel of the substance should, when opened, be dissolved to a 20 per cent solution and stored in iron drums having reasonably air-tight bungs. The solution will keep two or three months with practically no deterioration, and when required is very convenient for use.

In view of the ease with which sodium sulphide deteriorates, a method for the valuation of this substance will be found useful.

A rapid and yet efficient method involves the use of only two standard solutions.

$\frac{N}{10}$

An — solution of sodium thiosulphate is made by dissolving 62.0 grams of the pure crystals to a total volume of 2½ litres.

31.75 grams of iodine are dissolved with 50 grams of potassium iodide in a small quantity of water. When the solution is complete it is diluted to 2½ litres to form an $\frac{N}{10}$ — iodine solution.

Both solutions may be conveniently stored in Winchester quart bottles.

The two solutions should be equivalent, but this point should be tested. For this, 20 c.c. of the iodine solution should be placed in a flask containing about 200 c.c. of water. The sodium thiosulphate solution is run in from a burette till the color changes from brown to light yellow. A small quantity of a 1 per cent starch paste is added, and the addition of the sodium thiosulphate continues till the blue color (formed by the starch) just disappears.

The sodium thiosulphate solution is considered as $\frac{N}{10}$ and from the amount required the strength of the iodine solution can be calculated. It is then advantageous to so adjust the iodine solution so that it is exactly equivalent to the $\frac{N}{10}$ sodium sulphate solution. 7.8 grams of the sample of sodium sulphide are exactly weighed and dissolved to one litre.

In a large flask containing 500-600 c.c. of water is

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RIDER TICKETS
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HIGHEST QUALITY
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If you are already using seals, riders, etc., send samples and quantities for quotation. Prompt attention to inquiries.

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STANDARDIZED INDUSTRIAL SEATING

Seating the worker so that each can produce more efficiently need not mean a variety of special chairs or stools. . . . . The posture requirements of the individual worker may be met by *standardizing* on one type of seating.

This type, if adjustable to height and with an adjustable back-rest, enables the seating to be shifted to different operations and be equally adapted to workers at each.

It reduces both expense and purchasing effort.

FS-14 Patented Adjustable

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Builders of Correct Industrial Seating
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FS-15 Patented Adjustable

DIXIE MERCERIZING CO. CHATTANOOGA, TENN. STRENGTH QUALITY LUSTRE

Mercerized Yarns

C. P. Mercerized Cones & Skeins
20/2-80/2 Natural and Gassed

DIXIE MERCERIZING CO.
CHATTANOOGA, TENN.

REPRESENTATIVES: Philadelphia Pa., Cameron & Pfingst—Reading, Pa., Cameron & Pfingst—Chicago, Ill., Kentucky Textile Products Co.—Louisville, Ky., Kentucky Textile Products Co.—Canada, Slater & Co., Toronto.

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Manufacturers of
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PINE BOX SHOOKS

Bradley Stencil Machine

The Bradley Stencil Machine makes Stencils in half a minute at reduced cost of 1-10c each. Write for catalogue and price list.

In universal use by thousands of manufacturers and shippers.

Oil Paper, Stencil Paper and Inks. Bradley Ball Stencil Pot uses Liquid Ink for marking and stenciling. Price 60c or $6.00 per doz. Manufacturers of Oil Stencil Papers.

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A. J. BRADLEY MFG. CO.
99 Beekman Street NEW YORK

placed 50 c.c. of $\frac{N}{10}$ iodine solution and 10 c.c. of 20 per hydrochloric acid. 20 c.c. of the sodium sulphide solution are then added with vigorous agitation, and the end of the delivering pipette is maintained in the liquid. The addition of the sodium sulphide should not take less than one minute.

The mixture is then titrated against the $\frac{N}{10}$ sodium thiosulphate solution in the manner previously described.

Let n c. c. of $\frac{N}{10}$ sodium thiosulphate be required.

Then the amount of sodium sulphide in sample $=$ $(50 - n) \times 2\frac{1}{2}$ per cent.

The Yarn Market.

October-November can be rightly described as a "recovery period" for cotton yarn prices in the Philadelphia market. Last month a decided rise was reported as obtaining in middle October, and later developments bear out the fact that the gait at which quotations were ascending has since developed into a healthful sprint. All through the published list rates went forward from day to day to a higher level, and at this writing, 30s/2 warps, as an illustration, are quoted at 60 cents, which is just exactly a dime higher than the asking price published here last month for this same count. This being a popular count, its increase may be a little above that of the rest of the list, but still its rise is indicative of the entire group of yarns going through this market.

And prices at the moment seem to show no signs of necessity for being relegated to the fatigue list in the near future. New life has been taken on, and they are existing in all the health and radiance of a rejuvenated invalid. From what seems to be the general consensus of forecasting in this market, the market may be expected to ride on the present plane of quotations for some time yet, at least. This is not a prediction, but the reasonable deduction to be drawn from the varied conditions affecting this industry.

This most recent renewed vigor and activity is, as always, attributed to numbers of sources, but perhaps the most accurate are those who contribute the higher prices, first, to the realization of the actual cotton conditions existing in the southern belt, and the bullish actions of the raw staple, and second, to an increased demand which has come from consumers as a result of depleted stocks, acquired over an extended period of watchful waiting, and of their recognition of the real conditions with which the cotton world is now confronted and with which it will meet still more forcibly later on. It seems that the demand has come as an inevitable consequence of a number of influences which during their existence have caused the market to be dormant temporarily, perhaps, but which, eventually, had to show a different kind of effect on yarns.

The demand came mostly for carded warps for weaving purposes, which would indicate increased activity in this section of the industry. Orders for this class of yarns began the period strong and continued throughout, and constituted the bigger bulk of the business done. Combed skeins and warps, together with yarns for knitting purposes, started off slowly, with a buyers' market, this being attributed to unsatisfying business conditions in the industries using these grades. Early November, however, saw these yarns also come into demand, and for a time stocks on hand were sufficient to ship promptly the demands received for them.

Naturally, the increase in demand, combined with better staple prices, helped turn the market into the hands of the sellers, and the spinners, who have long been pointing to the absence of profits to them at the prices which have prevailed in the past, took the opportunity to edge up their rates and more nearly approximate, as they pointed out, the level at which they would operate with a fair return on their investments.

Not only were the sellers increasing prices, but they were rather averse to committing their productions very far into the new year, and in the instances in which this was done, it was reported that prices considerably above those published in the subjoined list were asked and received. It appeared that now the spinners desired to assume the period of watching and waiting to see what is going to happen with the turn of the year.

A number of factors have contributed toward making the emergence from the lower price levels to the increased rates easy and comfortable. The matter of credits generally was reported excellent, and an absence of speculation in the market was also noticeable. The continuance of such a condition will greatly prolong the life of the present period of activity.

Following are quotations on the Philadelphia market for November 17:

Single Skeins.

4s to 8s	41		20s	46	@47
10s	42		24s	48	
12s	43		26s	50	
14s	43	@43½	36s	55	@56
16s	44	@45			

Single Warps.

8s	42		20s	46	@47
10s	43		26s	51	
12s	43½	@44	30s	56	@57
14s	44	@44½	40s	63	@64
16s	45	@45½			

Carpet and Upholstery Yarn in Skeins.

8s and 9s ¾ slacks	40				
8s ¾ tinged tubes	38½	@39			
8-3-4 hard twist waste	38	@39			

Two-Ply Skeins.

8s	42		20s	47	@50
10s	43		24s	50	@51
12s	44		26s	52	
14s	45		30s	57	@58
16s	46	@47	40s	66	

Two-Ply Warps.

8s	42		20s	47	@50
10s	43		24s	52	@53
12s	44		26s	54	@55
14s	45		30s	57	@60
16s	46	@47	40s	67	@70

Frame Spun Carded Yarn on Cones.

8s	40		22s	44	
10s	40½		24s	45½	@46
12s	41		26s	46½	@47½
14s	41½		30s	40	@50
16s	42		40s	52	@53
18s	42¼		30s double carded	53	@54
20s	43½		30s tying-in	49	@50

Two-Ply Comber Peeler Skeins and Warps.

8s to 16s	55	@57½	50s	88	@90
20s	60		60s	$1.00	@$1.05
24s	62½	@65	70s	$1.10	@$1.15
30s	70		80s	$1.30	@$1.35
40s	80				

Mule Spun Carded Yarn.

10s	43	20s	48
12s	44	24s	50
14s	45	26s	52
16s	46	30s	56
18s	47	40s	70

Mule Spun Combed Peeler Yarn on Cones.

10s	53		26s	68	
12s	54		28s	72	
14s	55		30s	75	
16s	57		36s	85	
18s	58		38s	87	
20s	60		40s	90	@95
22s	63				

Among the Knitting Mills

The location of the mill of the Taylor Knitting Mills has been changed from Hickory, N. C., to White Pine, Tenn.

The Robbins Knitting Company, High Point, N. C., has received a certificate of incorporation, and is the latest addition to the textile plants of Guilford County. It is capitalized at $150,000, and C. C. Robbins, O. C. Durland, and S. H. Holloman, of High Point, are the incorporators.

A. W. Lucas, of the Pinewood (Tenn.) Knitting Mills, is reported to be investigating the possibilities of Mt. Pleasant, Tenn., as the location for a new knitting mill.

The capital of the Davenport Hosiery Mills, Chattanooga, Tenn., has been increased $200,000, and unofficial reports state that a $100,000 addition to the present plant will be made, plans having already been drawn.

A new two-story addition to the knitting department was recently completed by the Union Manufacturing Co., at Union Point, Ga. The building is of brick construction, 150x80 feet. The upper part is to be used for knitting, ribbing and looping, while the lower part will be utilized for an inspecting and pressing department. The company now has 425 knitting machines with 176, 200 and 220 latch needles, 60 loopers, 90 ribbers, 4,000 ring spindles and other machinery to match.

The Josephine Knitting Mills, Cherryville, N. C., are erecting a brick building in which their machinery will be installed.

The Real Silk Hosiery Mills, Inc., Indianapolis, Ind., has filed notice of an increase in capital to $265,000.

Littlewear Mfg. Co., Montgomery, Ala., has been making plans for a new underwear plant in that city. Bernard Scheuer is in charge. Complete details have not been announced, but it is expected operation will begin about the first of the year.

Clark Knitting Co., Inc., Warren, Ohio, recently organized, will manufacture mercerized hosiery. They will construct a two-story building, with 3,000 square feet of floor space. The officers are: R. E. Jones, president; F. W. Smith, vice-president; E. E. Clark, secretary and general manager; W. M. Gall, treasurer.

Ideal Hosiery Mills, Maryville, Tenn., are planning for the installation of a number of new knitting machines, ribbers and loopers.

The new Claussner Hosiery Co., Paducah, Ky., will operate nine full fashioned knitting machines, four loopers and four sewing machines. A new building has been constructed. Robert Claussner is superintendent.

The Commercial Club secretary at Collinsville, Ala., is negotiating with hosiery knitters regarding the location of a hosiery mill at that place.

Rome Textile Co., Rome, N. Y., manufacturers of children's ribbed cotton underwear, is spending $10,000 making improvements at its plant. Alterations to increase the output are being made.

The Aurora Knitting Mills, Pottstown, Pa., have completed plans for the construction of a new three-story and basement mill, 63x120 feet, to cost approximately $60,000.

The Merritt Knitting Mills, Newark, N. J., recently organized with a capital of $125,000, propose to operate a local mill for the manufacture of knit goods. The company is headed by Joseph Pelp and I. Seckler, 33 Green street, Newark.

The Rosanna Knitting Mills, Inc., New York, N. Y., has been organized with a capital of $25,000 to operate a local plant for the manufacture of knit goods. The company is headed by J. J. Long and E. C. Barton.

The Alpha Knitting Mills, 570 Thirteenth street, West New York, N. J., has filed notice of organization to operate a local plant for the manufacture of knit goods. John Novak, 559 Hudson avenue, Weehawken, N. J., heads the company.

John M. Haley & Co., Inc., New York, N. Y., has been organized with a capital of $200,000 to operate a local plant for the manufacture of knit goods. The company is headed by J. M. Haley, W. S. Duncan and E. W. Hazlett.

The National Knitting Co., 905 Clinton street, Milwaukee, Wis., has foundation work in progress for the construction of a new one-story mill addition, 40x100 feet, estimated to cost about $25,000. A list of equipment for installation will be arranged at an early date.

The Century Knitting Mill, Hazelton, Pa., has placed a new mill addition in service and expects to develop full capacity at an early date. From 50 to 75 operatives will be added to the working force.

The Hanover Knitting Mills, Brooklyn, N. Y., have been organized to operate a local plant for the manufacture of knit goods. It is capitalized at $10,000, and is headed by I. Greenberg.

The Better Sox Knitting Co., 211 South Water street, Fort Atkinson, Wis., will soon break ground for the construction of a new two-story mill, 50x65 feet, estimated to cost close to $40,000. It will be used for general increase in production, and a list of equipment for installation will be arranged at an early date.

Alfred Meynardi, Wilkes Barre, Pa., is organizing a new company for the operation of a local knitting mill. Negotiations are under way for existing property and equipment will be purchased at an early date. It is expected to give employment to a working force of about 50 operatives for initial production, and which will be advanced to approximately twice this amount shortly thereafter.

The United States Hosiery Mills, Boston, Mass., have filed notice of organization to manufacture knit goods. A local plant will be operated. A. I. Berman, 623 Washington street, Boston, heads the company.

An attractive booklet exploiting Youngstown's advantages, resources and opportunities as an industrial center has been issued by the diversified industries committee of the Youngstown, Ohio, Chamber of Commerce. Interesting information on various manufacturing organizations located in this great industrial center is given, and the book as a whole points to the great extent to which industry has developed there. Among the plants illustrated is that of the Youngstown Sheet & Tube Company. Emphasis is placed upon the importance of the production of iron and steel and their products in the growth of Youngstown, over 250 lines of manufacture being listed as using Youngstown iron and steel as basic materials.

Humidity in Cotton Mills.

(*Continued from page* 104.)

experienced. The higher the temperature the more noticeable is the effect of moisture deficiency. If the bulb of an ordinary thermometer be covered with a wet cloth it will indicate a temperature several degrees below what it did previously. The difference between the wet and dry bulb thermometer temperature indicates the degree of moisture deficiency.

In card rooms at a temperature of 75 degrees the depression of the wet bulb should not exceed 10 degrees, indicating the presence of 5.2 grains of moisture per cubic foot, equaling 55 per cent.

In spinning rooms at a temperature of 80 degrees the depression of the wet bulb should not exceed 11 degrees, indicating 5.8 grains of moisture per cubic foot, equaling 55 per cent.

A greater moisture deficit and consequent greater wet bulb depression cause an excessive evaporation of moisture from the yarn, causing it to become brittle and weak. To keep the temperature in a spinning room down to 80 degrees or less in summer requires a volume of fresh air proportional to the cubic capacity and temperature, and it is essential that the fresh air be cool and pure. To condition the air by steam causes a feeling of languor to be experienced by the operatives in the room; it is unhealthful and cannot be too severely condemned.

Again, air is not cooled to any great degree by simply passing it through water or showers of water. The water must be split up into very small particles or spray like a dense mist, which has a remarkable cooling effect upon all air passing through it at a proportionate velocity. That is, the cubic feet of air per minute must be proportionate to the square feet of cooling surface generated, and this can only be obtained by a really good humidifier.

To more thoroughly understand the relation of humidity to heat, it is well for us to know that the temperature felt by our bodies, or, the sensible temperature as it is called, corresponds to the temperature of the wet bulb thermometer, hence the drier the air the greater is the difference between the actual and the sensible temperatures. Personal sensations of heat and cold depend by no means on temperature only. A sudden increase in humidity frequently gives the sensation of oppressive heat which the thermometer does not confirm. Hence the mistake of previous humidifying installations in supplying a small volume of air with a high humidity, in fact, in some cases the incoming air is supersaturated and has the effect of raising the wet bulb nearer to the level of the dry which, being already too high, the result is oppressiveness.

It will be clear that the best system will supply a large volume of fresh cool air at a point just below complete saturation, and which also has the advantage of keeping the distributing pipes dry, so avoiding corrosion or lodgments of water in the pipes, in which case it may be pointed out there will be an entire absence of drops.

The higher the fresh air intake in a mill (all windows should be kept closed) the less likely are we to get the street dust, but we are more likely to get the black soot, and it is most important that the fresh air supply to the mill should be above suspicion. An air supply should be clean and pure and of sufficient moisture; these, briefly, are the considerations which must be borne in mind. Every particle of air passing at a high velocity through a humidifying installation must be thoroughly purified and moistened in the instant elapsing between entering and leaving the humidifying chamber. Not only this, but every particle of free moisture must be separated and removed from the air before passing further.

Spinners do not seem to be agreed in their views concerning the proper temperature and relative humidity that should exist for the best spinning of cotton. The general opinion, we believe, is in favor of a temperature of 68 to 77 degrees, and the relative humidity of 50 to 55 per cent for carding, 55 to 60 per cent for spinning, and 65 to 70 per cent for weaving. This is not an unhealthful atmosphere for the workpeople, though the best hygienic conditions may be said to be nearer 65 degrees temperature and 65 per cent relative humidity. The relative humidity for weaving in a cotton mill should be higher than that for spinning, so as to prevent the breaking of the yarn in the loom, especially in the warp.

The relative humidity of the atmosphere is of more importance than the absolute humidity. It is better to have a low temperature with a proper percentage of relative humidity than a high temperature and an under percentage of relative humidity.

A uniform standard of humidification assists the operation of such machinery as relies for its regularity of operation upon climatic conditions. Looms have a delicate adjustment of pick which is affected by moisture. Cards are affected by electricity when the air is dry. Spinning frames vary their band tension as the humidification changes, etc.

Considering the matter first from the standpoint of cheap product, it is possible that the principal advantage in artificial humidification lies in getting a larger product from the operative because of the beneficial physical effect of a suitable atmosphere, and the lessening of labor required on the machinery. The same percentage of relative humidity does not necessarily produce the same physical result at all temperatures. A definite percentage of relative humidity at one temperature may make the conditions very disagreeable to the operatives at another temperature. The English factory laws, for instance, allow a relative humidity of 88 per cent at 60 degrees of the dry bulb, but only 64 per cent at 100 degrees of the dry bulb.

The 75 per cent. which some accept as a general standard, is only authorized by the Cotton Factory Act, at a dry bulb temperature of less than 82 degrees. It is generally understood that the operatives prefer a temperature of between 70 and 76 degrees of the dry bulb, but it is not always possible to regulate the temperature as desired in hot weather.

The use of humidification to cool the air in hot weather often produces a higher percentage of relative humidity than is recommended in any standard table. The cooling effect lessens as the humidity increases. It must be understood that proper humidification is impossible unless good thermometers are used, and unless the wet bulb is properly moistened and used with clean wicking. The wet bulb thermometer should be at a sufficient distance so that the moisture in the wick or the water holder will not affect the dry bulb. Wet and dry bulb thermometers, it must be remembered, give the conditions of the atmosphere only in

the immediate vicinity. In large rooms it has been necessary to have several sets of apparatus.

(This is the first of two articles on this subject by Mr. Wilkinson. The other article will appear in an early issue. —The Editor.)

An Old Timer Says:

(*Continued from page* 117.)

COTTON, to be printed under an assumed name if you like, and you will begin to get results.

Because when you get the other fellow's idea, that gives you another idea of your own and the first thing you know you can pat yourself on the back and say you know more about that particular thing than you ever knew before.

If you think it is a fool idea you have, come on with it and see if other overseers and superintendents think it is a fool idea. You may get agreeably surprised.

The one big thought I am trying to give you, Mr. Overseer, Mr. Superintendent, is that you are not studying your own job like you should. You seem to think because you have got the job, that you are through studying. Well, you *are* through if you are willing to slip backwards every year until you have slipped so darn far that you will finally settle down on some little backwoods job and just naturally dry up. For goodness sake, wake up, man! If there is a bright future ahead for the young man, and I know you will agree with me that there is—then there is just as bright a future for you.

"I am too old," did I hear you say? If you did, that means you are just simply too counfounded lazy. Hold on, now! Don't get "huffy" about it. If you deny the charge just sit right down and write out your case and I feel pretty confident I can prove you are a "big one."

Ever hear of L. S. Starrett? Yes, of course you have. Practically every cotton mill has many Starrett tools in it. Let me quote from an article about him: "Today he is president of L. S. Starrett & Co., he is rated as a millionaire, and has earned his right to his money and his title as a great tool maker *since his fiftieth year.* Starrett is the founder of L. S. Starrett & Co., the president, not just a figurehead. As a leader of 800 employees, he does not say 'Go!', but from far ahead he beckons to them, 'Come.' "

The article goes on to tell how he still invents many tools, how he plans active selling campaigns, etc. In fact it enumerates many things this 80 years *young* man does that the average man of 50 would think he was getting too old to attempt. Yes, I know you have your troubles; if you didn't, it would not be much of a job you have.

The very reason some men stand still is that they fall down just as soon as they run into something a little hard. Such men as that should stay at home and help mother wash the dishes while the kids work. You know the type I speak of.

The man who expects to reach that higher position must make up his mind that he is going to stick to the determination to improve himself by constant hard work and study. The joy of winning, without hurting others—that's the thing that gives life zest.

Think for yourself—be yourself. Every idea you promote makes you stronger for the next one.

Learn all you can by experience and profit by other men's experiences.

Don't envy successful men. *Be one.*

No one can help you as much as you can help yourself.

Your boss is an observing man. That's how he got to be boss.

Keep this thought with you if you forget everything else that "Old-Timer" has said:

While one lives there is opportunity for advancement. You are never too old. Will you be ready when the whistle blows?

Several men have become millionaires by adopting thoughts which other men have taken a lifetime to perfect. How about the phonograph? Edison gave the thought to the world and the Victrola and other people have made a lot of money out of that thought. One man invented a steam turbine, and now there are many successful turbines on the market. One man invented a power loom and another man or group of men conceived the idea of making it automatic; now we have several successful firms which are making money out of the idea. Franklin worked for years to find out a little something about electricity, and other men have made thousands of dollars where he made hundreds.

"Be up and doing or you will be down and done. Slang! Yes, I know it, but it also may be classed as pretty doggone good advice to a lot of overseers and superintendents who are sort of drifting along on their jobs just because right at the moment the "boss" is not raising he—ll, as Ring Lardner puts it, about something. Look out! First thing you know you will think a ton of brick has fallen on you

---

"Tall oaks from little acorns grow", but no man will ever hold a big job and command a large salary unless he can get to be broad-minded; lend an attentive ear to the experience of others; make earnest endeavor to interpret and carry out his superior's orders; and, above all, not forget that there are a few others that probably know as much as he does.

When you give your orders to your section men to do something that you know they really don't want to do, don't you admire the fellow who goes at the job wholeheartedly, like it was almost a pleasure? Well, now, how do you go at carrying out those same kind of orders for your superintendent?

Strange, but after a man has had several jobs he generally settles down on the size job which compares with his ability. Have you settled? If you have, remember that a man can practically make himself over by constant application and study. Come out of it!

COTTON is full of ideas that it has taken overseers and superintendents years of study, hard knocks and experience to find out. You can acquire them in a few minutes. What an opportunity! Are you taking advantage of them?

A friend of mine was recently talking to me very enthusiastically about installing humidifiers over his picker hoppers. Don't forget that damp cotton does not clean as well as dry cotton.

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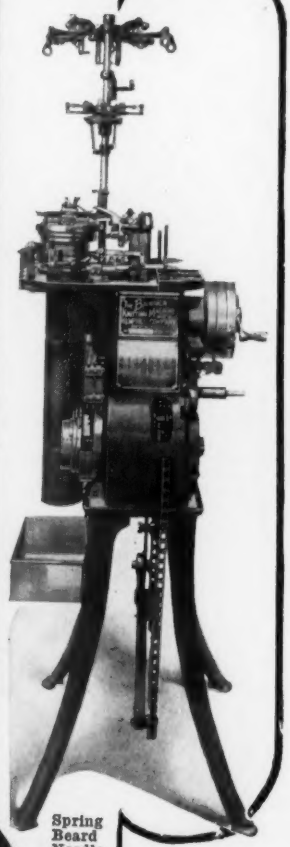
Simplicity Quality Speed Production

All Parts Accessible from the Front of Machine



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We have just placed on the Market two new models– The Spring Beard Needle, built in sizes of 3" to 3 3-4" diameter, and a new model —Split Foot Machine, built in sizes of 3 1-4" and 3 1-2" diameter.

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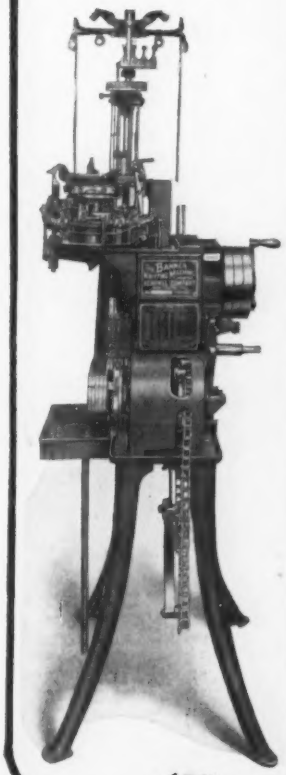

Split Foot Machine

HEMPHILL COMPANY

MAIN OFFICE AND FACTORY PAWTUCKET RHODE ISLAND

TRADE MARK

SOUTHERN OFFICE and SHOW ROOMS
912 James Bldg.
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Accuracy

TIME was when we measured exactness in fractions of inches. Today we measure it in thousandths.

What fifty years ago was almost incredible accuracy is now common standard for Excelsior Needles.

In none of the important dimensions is a variation as great as the thickness of this paper allowable—most measurements are held to about one half its thickness.

WHEN you specify "Excelsior" on your knitting needles you accept the judgment of many knitters who have been specifying in this way for more than a quarter century.

THE TORRINGTON COMPANY

— EXCELSIOR PLANT —

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NEW YORK.

MANUFACTURERS SUPPLIES CO.
CHERRY AND JUNIPER STS.,
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The Knit Goods Market

Brisk trading in the knit goods primary market suffered a temporary halt by the early November bulge in cotton. But this was of short duration, for as the quotations for spot and futures continued to mount higher as the days went by it came to be very generally realized in the trade that the higher prices being named by mills would have to be accepted by distributors if they intended to continue in business.

The reaction among buyers became quite pronounced when spot cotton scraped 27 cents. Prices of cotton knit goods which previously had been advanced only slightly were in many instances moved still higher, and as a sold-up condition had developed in a number of hosiery mills buyers for the first time gave evidence of rushing to cover. Price became less a matter of question than dates of deliveries, and since then buyers' resistance of prices has been giving sellers in the primary market less concern than a month or two ago, and there is less antagonism to advances than there then was to paying ruling prices.

It is shown that in the last two months some of the hosiery mills sold more heavily than was commonly attributed to them, and now, managers say, "We can sit tight for the next three months; we have nothing to sell for spot, and not a great deal for deliveries this side of March."

Some lines which for a time were off the market have been put back on sale at advances of from 10 cents a dozen on those which were selling around 95 cents, to 20 cents for higher priced goods. A ladies' stocking that was being sold for some time at $2.25 a dozen was marked up to $2.45, and jobbers have bought at the latter price. Misses' coarse gauge ribs, which a month or two ago were slow at 85 to 90 cents, were advanced by one of the larger concerns to $1.05, and sales at the latter figure have been recorded.

While a great deal of hosiery has been bought for both winter and spring, distributors have by no means covered for their requirements. There is a large number which had been repeating in chorus, "Prices will be lower." Some of these no doubt were influenced by the letter issued by the executive of a central west jobbing house in August, in which he foresaw lower wages and lower raw material prices and by implication instructed the buyers for the establishment to defer making their commitments for future. An extract from this letter, which is very interesting at this time, was as follows:

"I am convinced that raw cotton will sell at lower prices and that the reduction in the cost of production in consequence of lower wages, combined with the fact that when all the spindles are in operation it will cause an over-production (of yarn), that the prices of cotton manufactured merchandise will be lower for Spring 1923 production than the present quotations, and if such proves to be the case, the less merchandise we have on hand at the end of the year the less shrinkage we will have to take. Furthermore, the coal and railroad strikes may at any time develop to such a serious condition that business may be almost paralyzed, which is another reason for caution."

Only recently, after cotton had moved to new high grounds, a department store instructed its buyers to pay no advances on goods for stock and to buy nothing at any time at the advances unless they felt reasonably sure of a profitable outlet. This antagonism to the inevitable necessarily will disappear as stocks run low, and depletion, with many concerns, is not far distant.

Many distributors own merchandise advantageously, and unless they sell on the basis of replacement, retailers will have a period of very brisk selling, for they will be putting goods over the counter at lower figures than will be possible in the next few months. The public has had ample warning of the buoyant market and necessarily will be disposed to do its buying early. This will deplete stocks in short order and bring buyers to market to replenish. They they will get their first real taste of high prices, for it was felt cotton was destined to hold easily around the high November figure and more likely to go to 30 cents than recede, allowing, of course, for fluctuation. This was the view held by the buyer for one of the more important jobbing houses, who said:

"I cannot but feel, from the way things are shaping generally, that cotton probably will be as low in November as at any time later in the season, so that it seems to me conditions generally will tend rather to force an early opening."

Some interests are confident hosiery mills will have very good business until May, in any event. Then manufacturers will know pretty definitely the jobber attitude toward the new high prices. There is a possibility, it is admitted, they may enter upon a new era of resistance, again buying from hand to mouth, as was their policy for a great part of the last few years. But, some manufacturers say, "We are not in pressing need for business for delivery before April and by that time good merchandise will have been pretty well cleaned up."

One difficulty with which hosiery manufacturers have to contend is that of, in a way, adapting their prices to those fixed arbitrarily by jobbers and retailers. For example, a retailer is adamant against paying more than $4.25 a dozen for a stocking selling at 50 cents a pair; nor will he pay more than $1.25 a dozen for stockings to be sold over the counter at 15 cents a pair. Any advances above the figures mentioned as within the retailer's limit will take the hosiery involved out of the 50 and 15 cent classes respectively. "Will the retailers pay more and move their prices up accordingly, or will they substitute inferior merchandise?" is the question which is being asked by manufacturers.

Complaint is frequently heard of an abundance of trashy hosiery in the hands of distributors, blame for which is improperly placed upon manufacturers. The fact is, dealers have been buying price rather than merchandise, and are themselves to blame if, as is complained, the standards of cheap lines of hosiery have been lowered.

There has been a very strong demand for automatic top carded socks to sell at 10 cents a pair, and jobbers were so averse to paying an adequate price for a good stock in this class that they appeared to be content with the sewed toe, costing a few cents a dozen less than the looped toe, and were continually suggesting, "reduce the cost." This is what some mills have done at the behest of merchants,

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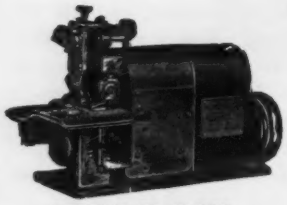
Makers of



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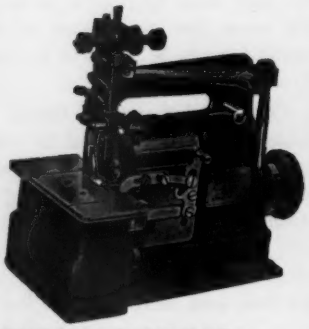
The Merrow High Speed Overseaming Overedging and Shell Stitch Machines.



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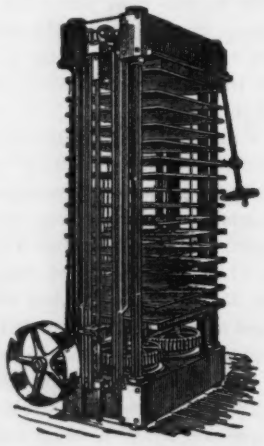

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Hot Plate Screw Press

FOR

Hosiery and Underwear

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JOSEPH T. PEARSON & SONS CO.

MANUFACTURERS OF

BONE DRY
HOSIERY FINISHING BOARDS

THAT WORK ABSOLUTELY SMOOTH

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GENERAL MACHINE WORKS

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Manufacturers of

Circular Rib Knitting Machinery

Cylinders and Dials

for keeping their operatives employed at, in many instances, wages so low as to be out of line with the cost of living generally and the increase in cost of manufactured products due to the high prices for raw materials.

King cotton has enabled not a few mills to dispose of cumbersome stocks of cotton hosiery profitably, whereas a short time ago they were begging for business at prices showing no profit over cost of production. That such stocks have been very generally absorbed is indicated by the fact that mills have been rejecting orders offered to them at the market and, in some instances, have repudiated their obligations as to deliveries of goods sold when the market was wholly in the buyer's favor.

Such manufacturers are doing precisely what many jobbers did during the long period of declines, and what many would do in relation to goods on order if cotton should go off say five cents a pound after there had been an accumulation of stocks while the market was rising. Even now some manufacturers are refusing business offered by dealers who have been reported for cancelling orders, and on the other hand there are jobbers who have declined to place business with mills not known to be covered for their yarn requirements or having a reputation for evading their contracts when the market turns against them.

While a number of lines of cotton hosiery are scarce for desired deliveries, there appears to be an excess supply of ladies' seamless silk, for there is being quoted prices which assuredly do not provide for a margin of profit. It is stated, and no doubt is true, that some of the better types of silk hosiery are available from mills at $1.50 per dozen less than the price when thrown silk was costing manufacturers $1.50 under today's best quotations.

The full-fashioned hosiery of one northern mill—perhaps of a number—is being offered for next year at less than the prices of six to eight months ago, notwithstanding raw silk is more than $1.00 a pound higher. One line of 18-inch 10-strand silk boot stockings is offered at $7 a dozen for at once delivery. The 20-inch 12-thread silk boot of another mill may be had for spot at $8.50. Both prices are under value and are possible because, it is stated, the mills need business.

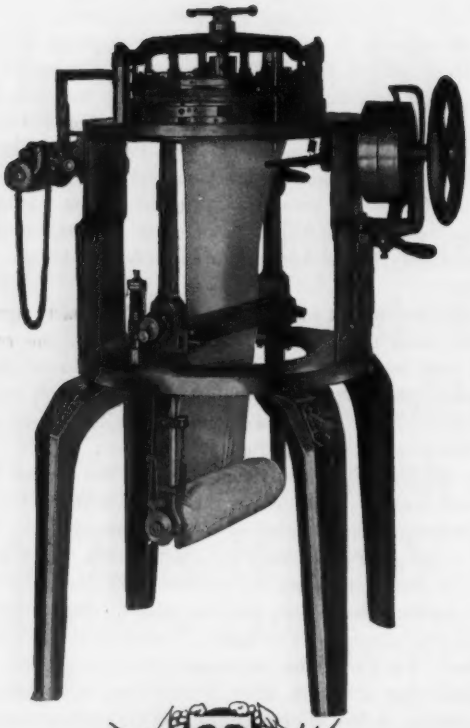
The two lines referred to are made on latch needle machines. Spring needle hosiery of 12 to 13-thread 20-inch boot was moved up recently from $9.50, at which price it had been selling freely, to $10.25, a figure at which jobbers are reported not operating. Spring needle silk hosiery has been attracting so much attention that a number of manufacturers using Banner machines are having them adapted to the use of the spring needles, the latter being the nearest approach to the full fashioned thus far attained in general fabric characteristics. There is thus developing a keener competition in spring needle hosiery, with the possible result that present prices cannot be maintained. This, of course, will operate to the advantage of manufacturers employing latch needle machines.

Carded hosiery of 176 needle for men and women has come into such demand that, it is found in some quarters, the trade is shifting from the finer to the coarser gauge as a price expedient, and there is considerable changing of machinery from 200 needle to 176. Half-hose of the latter number of needles is variously quoted at $1.05 to $1.10 a dozen, but likely to go higher on the present cotton market. One mill has advanced its price to $1.10 a dozen, an increase in the last two months of about 20 per cent. Half-hose of 144 needle is quoted at 95 cents to $1.05 a dozen, and this is another gauge very much in demand. In combed hosiery of high spliced heel and double toe, made on 220-needle machines, there has been no material price change for some time. A southern mill is quoting $1.65, but this is the price at which one of the northern mills has been selling for a number of months, so that the one simply has moved up to the level established by the other.

Operations in silk hosiery for winter and early spring deliveries seem to have been held in check by the trend toward wool hosiery, which since lower temperatures set in has been moving very freely, indications at this time pointing to a scarcity. For some months both manufacturers and jobbers were so doubtful as to whether ladies' wool hosiery would find a market that many of the former discontinued making them, while the latter were cancelling their orders in the face of a rising wool market. The better types—silk and wool in combination, at around $15.00 to $18.00 a dozen to jobbers—and the very low priced stockings have been the best sellers. But as stocks of these two classes gave promise of being absorbed before the season was far spent, moderate priced goods now are receiving much attention after having been neglected for a long while. A few southern mills still are making worsted hosiery, but evidently for spot deliveries, as they have been buying steadily of worsted yarns and calling for shipment by express.

Speaking generally, existing stocks of all-wool and silk-and-wool hosiery will be all from which the trade can draw supplies for the current and coming season. The low shoe and the unwillingness of woman to adopt the long skirts saved the day for holders of wool hosiery bought in advance of the present high prices of wool and worsted yarn. Several mills which had goods thrown back upon them by jobbers now are distributing direct to retailers, and it is stated they will not again sell to the jobbing trade. The Fay Hosiery Company of Philadelphia has met with very gratifying success in not only moving its stock of silk and wool hosiery, which jobbers would not take, but also in sufficient new business from retailers to put the machinery in operation to capacity after several months of idleness. The direct-to-retailer mills generally have increased their volume of business because of jobbers refusing to put goods in stock and have them ready for delivery as wanted. Retailers were in a better position for buying in their own limited way than were jobbers, as they had the mills to fall back upon when the jobbers did not have the goods.

From the number of new accounts which direct-to-retailer mills say they have obtained in the last six to eight months, it would appear that retailers have not been very much hurt by the operations of manufacturers and others selling to consumers direct through canvassers. The success of the Real Silk Hosiery Mills in Indianapolis, in the direct distribution of silk hosiery, was an inspiration for others to get into the game, and now there is being launched a nation-wide campaign by the Fitzhugh Hosiery Mills of Philadelphia. This concern, established in the last few months, is headed by a person well known in the cotton yarn trade who prefers that, for the present, his



REPUTATION

COUNTS in business as in everyday life. Our business career spans nearly half a century, and in that time we have established a reputation for fair-dealing and the building of dependable, durable machines for manufacturers of circular ribbed fabrics of all descriptions.

We claim for our machines simplicity, correct principles of construction, durability and excellence of workmanship.

Reputation—with half a century's time back of it.

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SUCCESSORS TO
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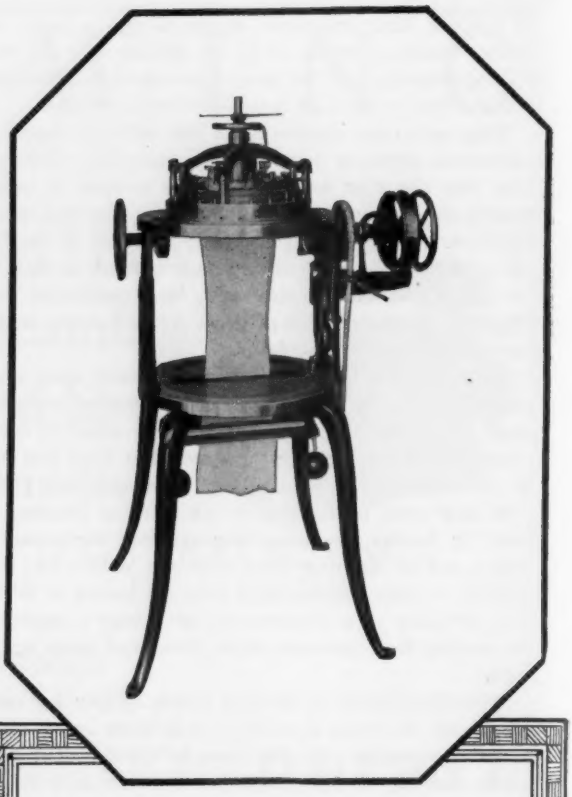

BRINTON BODYMACHINES

Plain or Automatic

Built in all sizes up to 24 inches. In all cuts up to 14 needles per inch.

You owe it to yourself to investigate this machine.

We also build all styles of Hosiery Ribbers and Knitters and various other circular machines for all kinds of knitted articles.

Samples, prices and particulars on request.

H. BRINTON COMPANY
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name be withheld. It owns no mill and operates through a concern controlling canvassers, almost one hundred of whom now are employed, in widely scattered communities. While the bulk of the business is being done in the middle states, there is a healthy flow of orders from points as far distant as Utah and Texas, and canvassers are operating in Tennessee. It is understood these canvassers carry no hosiery samples other than the line of the Fitzhugh Company, these lines comprising men's, women's and childrens' hosiery of silk and the better types of cotton.

Notwithstanding the inroads made on the business of jobbers by the operations of establishments selling to consumers and by a shifting of considerable retailer buying to mills direct, the hosiery market from the jobber viewpoint is in better shape than for a long time, and it seems assured there will be no slipping back from the gains which have been scored this fall. Advancing prices are a less deterrent to spirited buying since it has come to be commonly known that wage increases of 10 per cent and more have gone into effect in a number of northern mills. Among those to announce advances recently was the Powell Knitting Company, Philadelphia, and the Moorhead Knitting Company, Harrisburg, Pa., a shortage of skilled labor existing in both cities, while in Philadelphia there is considerable unemployment in various trades due to strikes and general cussedness on the part of an element that never will work unless it can dictate hours and wages.

Contrary to the expectations of many primary market operators, the buying of underwear for the winter of 1922-23 was stimulated by the strength of cotton. While it was steadily climbing after crossing a quarter, one of the better known resident buyers for a western jobbing house said to a representative of COTTON: "It seems to me that an early opening of fall goods will, in all probability, be forced by circumstances. I think there are quite a few buyers who are willing to operate and who, even now, are trying to operate quietly for fall with any mills willing to meet their ideas as to price."

November 15 was unconventionally designated as the date for the formal opening of heavy weight underwear, but while some manufacturers and jobbers were expressing a doubt as to the feasibility of an opening earlier than December, a great deal of buying in a quiet way was going on, and probably mills sold more underwear between the 1st and 15th than in the last half of the month. By the 15th the Appalachian Mills, Knoxville, Tenn., had sold so well into the first half of 1923 that the lines were withdrawn preliminary to a revision of the price lists, for by that time cotton was scraping 27 cents. Cotton ribbed 10 pound shirts and drawers were sold at $5.50 and 13 pound union suits at $8.50 for January, February and March, $8.87½ for April, May and June, and $9.25 for July, August and September. Slightly higher prices were named when the lines were put back on sale on the 13th, two days before the day set for the general opening.

The P. H. Hanes Knitting Company, Winston-Salem, N. C., was selling shirts and drawers at $6.25 for 10 pound and $6.50 for 11 pound, and the price of 16 pound union suits had been moved from $10.50 to $11.25, and 14 pound to $10.62½. The foregoing prices were for deliveries through December and March, inclusive.

While 16 pounds of cotton cost spinners $1.28 more on November 9th this year than on the corresponding date of 1921, 16 pounds of cotton fabric formed into one dozen union suits were bringing the mill only 75 cents more. It should be apparent that were distributors to cut their per centum of profit proportionately as have manufacturers, cotton knitted goods made from 26 cent cotton would cost consumers no more than when the goods were made from 18 cent cotton.

But, jobbers say, manufacturers bought yarn ahead and therefore were not required to base their prices on 26 cent cotton. This is true of many mills. Had they not done so, and had they pursued the waiting policy of many distributors, the latter would be paying more for next winter's underwear. Following the same line of reasoning, if jobbers had bought goods as early, relatively, as mills contracted for yarns, lower prices to the consumer would be possible. It remains for distributors to pass along to the dear buying public the advantage which they were accorded by manufacturers.

Not all winter underwear manufacturers have sold for the next season, nor have more than a comparatively few jobbers bought. But jobbers who did buy during November bought heavily and advantageously. The mills which sold may be assumed to have covered for their yarn requirements. A number are known to have contracted in October for cotton and yarns, but a greater number were still thinking of contracting when cotton hit 26 cents, so that much of the underwear going into distribution next summer and fall probably will cost quite a few pennies more than that which has been bought.

Stocks in retail stores were light—not enough for the season by far—when the time for donning heavier garments came, and jobbers and direct-to-retailer mills were almost swamped with rush delivery orders. A leading Philadelphia jobber believes a scarcity of underwear, except at somewhat higher prices, is inevitable, so far as relates to the current season. "We have been crowded with orders from retailers," he said, "and we are shipping from stock. When that is exhausted we will be through for the winter, as it would be almost impossible to have supplies reach us in time for advantageous distribution, and we would not care to sell against goods on order except we had evidence of shipment. I do not believe many mills have stocks of moment, and as several weeks might be consumed in making up goods to our order, our position at the time of placing the order might be an extremely hazardous one."

There is some doubt whether retailers will operate early in underwear for the next winter. They are the last to accept advances, and their distribution will not begin until the bulk of the next cotton crop has moved from the farm. They may receive an impetus from consumer buying during the intervening months, as they inevitably did with the revival of purchasing by the public in the last month or two.

There now is brisk demand for finished goods, but this is due in some measure to the fact there was low production, compared with potential output. Demand for cotton is looked upon as absolutely healthy, from the fact there is not in sight excess supplies, and demand will serve to sustain prices, unless they reach a level at which, in themselves, they will bring about curtailment of consumption; or production may again outrun consumption.

Retailers attempting an explanation for deferring their

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MERCERIZED YARNS

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EMPIRE BUILDING
PHILADELPHIA

ADAMS-FRANKLIN BUILDING
CHICAGO

MILLS
CHESTER, PA.

WESTAWAY BUILDING
HAMILTON, CANADA

purchases assert it has been their experience that more than 60 per cent of their winter weight underwear business was done after the 15th of November, and declare they will not change their policy of buying according to requirements as indicated from month to month.

There is expressed the fear that the present spurt will be followed by a lull at a time when duplicate buying ought to be brisk; that next year the underwear trade will go through the same trying situation with which it struggled during the present year, and that there will be a repetition of buying only as needs develop.

But strange things have happened. In the early part of November jobbers were buying case lots of underwear, frequently for drop shipment. In less than three weeks they were buying lots of 100 and more cases, to be delivered three to six months hence.

Probably not more than 60 per cent of the light weight underwear for next spring and summer has been bought. What was bought is being delivered at prices based on double carded yarn at around 41 to 43 cents. As few mills covered for yarn much beyond their sales, it looks as though the prices when repeat orders come in will be named on 50 cent yarn. But some of the Pennsylvania manufacturers declare they cannot get recently prevailing prices, and it is noted that yarn dealers received a number of requests that deliveries be deferred. The next tug of war on price will be witnessed when retail dealers come to market for additional summer underwear.

Sweater manufacturers, generally speaking, went out on November 13th to 15th with samples and prices for the winter 1923-24. A few previously had sounded out a number of conservative jobbers, with little or no success. Prices of worsted garments quoted to several jobbers are from 10 to 15 per cent above those for the current season, and each of the jobbers interviewed said they would not be interested at this time, although admitting that it would appear there can be no escape from such prices as were submitted.

One line of sweater coats, made chiefly from reworked wool, has been advanced but one dollar a dozen, although a dozen of the garments weigh 30 pounds. Some few lines are no higher than a year ago. Men's cotton sweaters are $1.25 up, to $9.37½ a dozen. It has been the aim to keep staples at an attractive price level.

Owing to the large volume of business for Adamant porcelain guides for textile machinery, it is announced, Mitchell Bissell Co., 334 Fourth Avenue, New York, have erected an additional kiln at their factory in Trenton, N. J. The new kiln which was expected to be installed about November 1st, it will increase their output about 50 per cent.

The codification of all the decisions of the Board of Appeals from the adoption of the New England terms for buying and selling American cotton to September 1, 1921, has been issued by the Arkwright Club of Boston. Copies have been sent to members of the Arkwright Club and the New England Cotton Buyers' Association, the organizations which paid the expense of the issue. Additional copies may be secured at $1.00 each at the office of the Arkwright Club, 605 Sears Bldg., Boston, it is announced by Wm. F. Garcelon, agent.

The Banding of Spindles.

(*Continued from page* 96.)

When pulling out the knife after passing the band over the cylinder, it is well to immediately cross the end held by the left hand with the end clamped in the knife; for trifling as this little action seems, it is actually a big time-saver. And the saving of even a second is a big item in banding. To illustrate how the crossing is effected, attention is referred to Fig. 4. Here, (1) represents the end held by the left hand, while the knife and the other end are shown by (2) as being crossed over (1). Expert banders will drop the knife over the cylinder, draw it back again, cross it over the end (1), grasp the crossed ends with the left hand, release the knife-blade with a pull of the right hand, place it on the lower spindle-rail, grasp the band ends, one in each hand, then slip one tail under the other—doing all these things in a few seconds. The first tie thus having been made, only the last remains to be carefully completed, and the tails cut, after which the band is thrust into place with a short-nose hook, or with the forefinger. The latter is preferable on medium or fine work, since one can thus more accurately gauge the initial tension. Putting the bands into the whirl with the band rod is not a commendable practice, because the largeness of the S-bend stretches the bands unduly.

It may perhaps not be irrelevant to say at this point that a defective cylinder may catch at a band and in doing so hurl the knife back at the bander. Giving the knife a complete merry-go-round ride, and finishing with a centrifugal trip in almost any direction is another of the playful antics of the cylinder. Probably no serious accident from this aeroplaning habit of the knife has as yet occurred; but as a pitcher may break at its 100th trip, so, eventually can a major accident develop from the hurtling knife.

Defective places on the cylinders which are apt to pick up the knife should be early remedied; but if the trouble is prevalent on many or most frames, a heavier knife may remove the difficulty entirely. Aging cylinders channel considerably, and this circumstance, together with a corroded condition of the cylinders extending to the very edges of the grooves, cause the latter to grip the band. Wetting the band along its whole length or at least that part that makes contact with the cylinder will stop the gripping tendency. But as has already been stated, too much wetting is injurious to the good running of the band. The cure may be worse than the disease.

On running frames the knot is tied against the base of the spindle below the whirl, and the band is then slipped into the whirl. When, however, a machine is stopped—during the noon recess, for instance—the knot can be tied directly in the spindle whirl. More care must be taken when passing the knife over the cylinder on a stopped frame than on a running frame because of the greater possibility of inadvertently "crossing" the bands. With a running frame this crossing is instantly brought to the attention by the noise always arising from such an action; while, of course, with a standing machine there is no such warning.

To facilitate finding the spindles requiring banding, it is advisable to have the bobbins placed at or over the spindle—say on top of the creel, or on the threadboard. The top of the creel makes it easy to instantly ascertain the banding situation. System in the routine of tying on the bands being essential, it is well to insist that the bander start at one end of the room and move in orderly manner from machine to machine.

[This is the first of a series of two articles. The second will appear in an early number.]

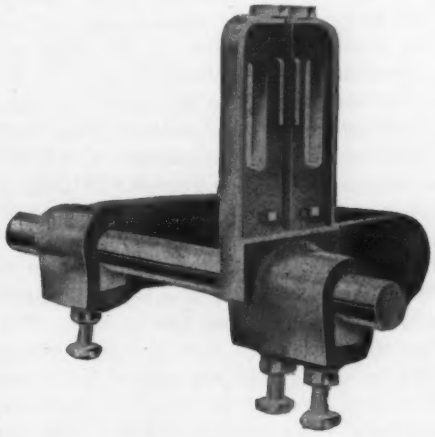
Inventions in Textile Equipment.

(*Continued from page* 112.)

The worn parts are milled out and the Williams bearing inserted; the worn parts being reclaimed.

Another feature of this bearing is that it is oilless, being made of hard wood saturated with oil, thus eliminating undesirable black oil on the warps and cloth. Mr. Williams declares that this bearing will free the let-off, lighten the burden on the warp by keeping a regular tension, and line up the whip rolls.

It is a well-known fact among weavers, superintendents and other operating executives that lost motion in the rocker bearings of automatic looms is an undesirable feature, as



lost motion here will likely cause a broken shuttle, a broken bobbin or a smash in the warp when the transfer makes its change.

As a means for eliminating this lost motion in rocker shafts, J. A. Wix, of Goldville, S. C., has designed the Wix adjustable rocker bearing, an illustration of which is shown herewith. This bearing, it will be noted, has a follower block on which the rocker shaft rests. Under the follower block are adjusting screws, so that as the block wears down from constant use, the adjusting screws can be tightened up, taking the lost motion out of the rocker bearing.

A new kind of hand cleaner was recently demonstrated in Boston, during which it is reported paint, pitch, tar, oil and graphite, printers' ink and that worst of all substances to remove from the human epidermis—gasket shellac—were washed off the hands of the demonstrator. The product used for this washing and cleaning work is called Hindu-Hand-Ha-Ha, which "has the laugh on grease," and which is made and distributed by Warren Soap Mfg. Co., 77 Summer St., Boston, Mass.

The idler steals from himself—that matters little. He also steals from you—that's different.

Scientific Kier Boiling.

The work of properly boiling-out cotton fibers is a profession in itself. It involves skill, and an extensive knowledge of both cotton fiber and alkali, together with the chemical reactions which may take place when cotton is immersed in an alkaline solution.

The closely related process of dyeing likewise is a profession of extreme importance in textile manufacture, but dyeing, largely because the effects of good or bad workmanship are more visible, has made the greatest progress along scientific lines.

Boiling-out should be conducted with full understanding of every step that enters into it and in the light of the most scientific knowledge accessible. Yet the process commonly used today still rests, in great measure, on a basis established many years ago when technical knowledge of the principles involved was limited and crude. Though the most important step in the entire process of bleaching and dyeing, search for better methods has been neglected. As a consequence when results in the dyehouse are below par the cause is very frequently traceable to an inferior quality of work coming from the kiers. And why not, with such divergence in the practical views of operators? Ideas on boiling-out are often as far apart as the two poles. Practically no two bleachers agree.

To illustrate: it is not at all unusual to find one mill using 3,500 gallons of liquor for boiling out four tons of cloth, while another does the same work with 2,000 gallons. In one instance, the cloth is covered with from six inches to two feet of liquor, while in another, one finds the liquor 18 inches under the top of the cloth.

Of a truth, the weave of the cloth and other conditions vary in different plants, but it is highly improbable 3,500 gallons are required for four tons of cloth. This amount of liquor was used in the days of wooden tub equipment when the top of the cloth was exposed to the atmosphere, but the modern operator—the one who is more closely governed by the scientific principle underlying the operation of the up-to-date steel kier—uses approximately 2,700 gallons and has his cloth covered by a few inches of liquor at least.

It is a primary object of this discussion to draw attention to these differences, promoting a spirit of investigation that will result in greater uniformity by applying scientific principles.

Many bleachers appear to overlook the fact that the speed with which the liquor circulates is equally if not more important than the strength of the liquor. We observe also that few bleachers take into consideration the condensation of steam during the boil. This may add another thousand gallons of water to the liquor. If an outside heating kier is used, there is no increase of liquor volume during the boil. But with an inside heating system due allowance must be made for the steam that condenses in bringing the liquor up to the boiling point.

What is true with respect to the prevailing need of attention to the mechanical features connected with boiling-out, equally applies to the constituents of the boiling-out liquor. Many boiling-out agents have appeared but there has been a lamentable lack of true progress in either refinement or efficiency of the materials used. Caustic soda and soda ash are unreliable standbys which have come down through the years, together with the disagreeable and even injurious features which sometimes accompany their exclusive use.

Certain impurities of cotton cloth contain nitrogen; others are soluble in ether only. These, if incompletely removed from the cloth previous to the chemic, cause yellowing of the bleached cloth in the steam test or during storage. For instance, print cloths, after colors have been applied, are usually submitted to live steam for the purpose of fixing the colors. Unless all coloring matter natural to the cotton, and all waxes and oils, have been removed in the kier boil, the steam will yellow the content to a considerable extent. Thus the whitening effect of the bleach is destroyed.

Moreover, pectoids have the power to absorb chlorine, giving rise to chloramines. Tannic acid, if not completely removed, frequently causes stains when brought in contact with iron. Pectins which readily dissolve in alkalies are intimately associated with the natural coloring matter of cotton.

In order that the cotton cloth may stand the steam test without yellowing, all impurities such as these must be removed. The coloring matters containing nitrogen, and all waxes or oils of an ether-soluble nature, are destructive of good quality and cannot be permitted to remain in the cloth at the period of the steam test.

Bleached cotton containing from 0.25 to 0.5 per cent of oil and nitrogen indicates a faulty boil.

The foregoing statements are extracted from a leaflet recently issued by The Electric Smelting & Aluminum Co., Inc., Lockport, N. Y., entitled "Scientific Kier Boiling as an Aid to Your Sales."

E. I. du Pont de Nemours & Co., Wilmington, Del., have announced the following new colors: Sulfogene Cutch O, a sulphur color of yellowish brown shade, used chiefly as a base for browns, khaki, drab and mode shades; Pontamine Fast Red 8BL, a direct color of a bluish red shade; Pontamine Diazo Bordeaux 7B, for clear bordeaux and claret shades; Pontamine Diazo Scarlet R and A, for brilliant scarlets to full reds; and Pontamine Diazo Orange, for bright orange shades, all developed colors.

A booklet on line shafting equipment has been prepared and issued by The Medart Company, Potomac and DeKalb Streets, St. Louis, Missouri, that contains nearly 200 pages of helpful information on this subject for the mechanical man. The aim of the company in presenting this booklet is to state dimensions, details of construction, etc., in a way to enable engineers, mechanics and power users to plan installations of and purchase the equipment described. Complete information is given on couplings, collars, hangers and bearings, brackets, pulleys, gears, and other line shafting equipment and accessories.

The Society of Dyers and Colorists, Pearl Assurance Buildings, Market St., Bradford, England, has issued a color index dealing in tabular form with all the dyes of known constitution which have received commercial names. It was the aim of this society in preparing this index to produce as accurate and comprehensive a work of reference as possible, with a view to meeting the requirements of color manufacturers, users, and students of color chemistry.

SANDOZ

ANILINE DYES FOR ALL TRADES

We carry a complete line at all Branches

For samples and prices apply at any of our offices.

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INCORPORATED

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Dixielite attracts and reflects more daylight and lasts years longer than any other mill white made. Write for Booklet No. 51 "Keeping in the Spotlight."

EXTERIOR Surfaces of brick, cement and stucco need Bay State Brick and Cement Coating. It beautifies and waterproofs. Write for booklet.

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DIXIELITE

AUTO GYP
Process of Dyeing

Let Us PROVE That

BLEACHING is UNNECESSARY

Let us prove our claims to you—with your OWN materials—under your OWN conditions, with your OWN equipment and in your OWN plant—AT OUR EXPENSE.

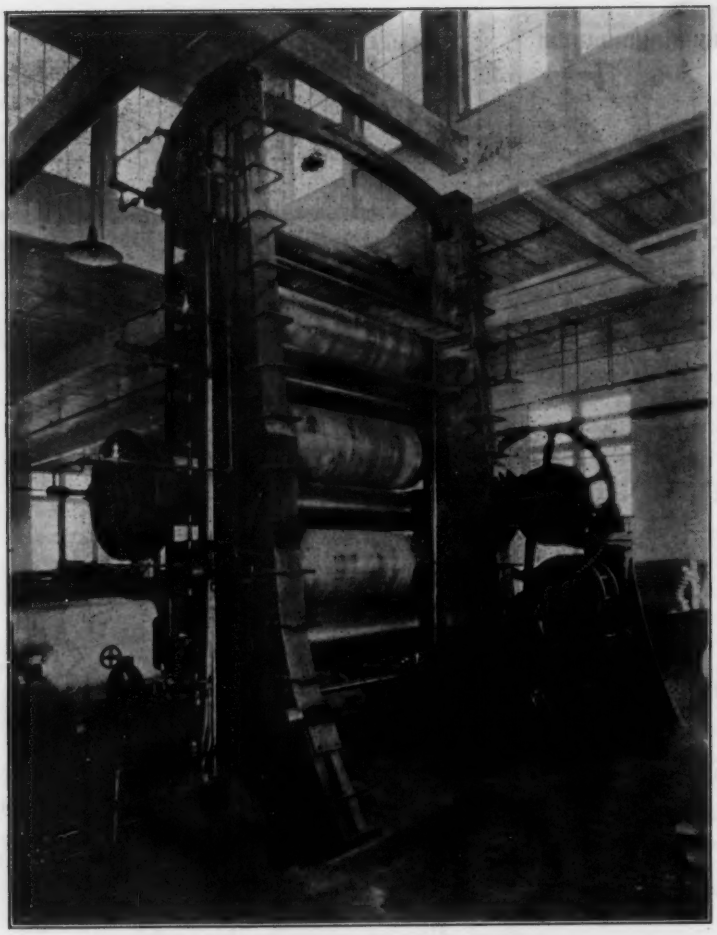
Could anything be more reasonable?

AUTOGYP *bleaches* as it dyes, thus entirely eliminating the troublesome bleach. It saves six separate operations, 3½% of shrinkage, 25% of tensile strength, 50% of steam, 30% of labor, 90% of water and saves all the chemicals used in the chloride of lime method of bleaching. That is not all—AUTO-GYP further saves boiling out in kiers, saves 4 to 17 hours time, as it performs the whole operation in 3 hours time, and it dyes to required shade, eliminating specks, motes, leaf and shives.

Let us send you further information on how AUTO-GYP can be made a real paying proposition in YOUR mill. A Postal brings it.

Surpass Chemical Co.,
Albany, N. Y.

SURPASS CHEMICAL CO. AUTOGYP ALBANY N.Y.



Butterworth Calender Rolls are always uniform in density or hardness

The services that your calender rolls will give is determined **when they are being made** by the material and care that is put into them.

Take for instance Butterworth cotton rolls:

(Of course, we also make various combination rolls including our patented cotton and excelsior rolls.)

Butterworth Cotton Rolls are made throughout of long staple cotton. We believe that this is best suited to the hard service to which calender rolls are subjected.

It's true that cotton rovings do make an absolutely white roll —but we were talking of quality, that thing which says "most service per dollar."

—And this same quality will be found in all Butterworth Products. It is the foundation upon which this business—now 102 years old—was built.

If you would like to know more about Butterworth Calender Rolls or any Butterworth product, write us direct or get in touch with any nearest district office. Any of us will be glad to discuss your individual problem with you.

Butterworth Products

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Bleaching Machines
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Dyeing Machines
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Mangles (all kinds)
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Color Kettles
Cell Dryers

BUTTERWORTH

And here is the new Butterworth Self-Aligning Tenter Clamp which under all conditions grips the entire selvedge of the fabric.

There is a strip of special alloy brass inserted in the nippers of this clamp. This is pivoted in the centre so that it will grip rolled selvedge or uneven thickness of fabric at the same time.

For ginghams or loose selvedge goods rollers are used in place of shoe, operating the clip.

This new four-inch self-aligning clamp can be easily substituted on any tenter; top wood covers, openers and sprocket wheels alone requiring replacing.

Also, nipper arms have been bridged to make them still stronger.

H. W. BUTTERWORTH & SONS CO.

Established 1820

Philadelphia, Pa.

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Hamilton, Ontario, Canada

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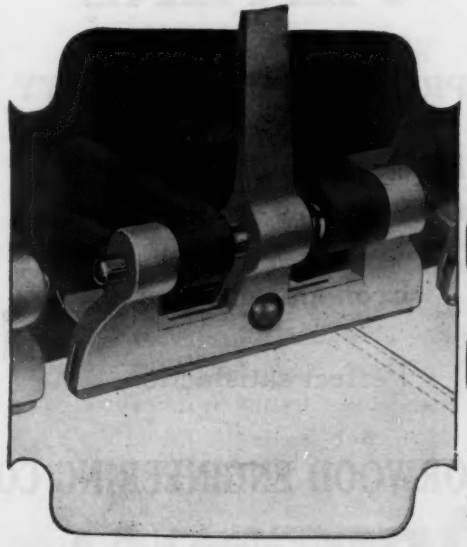
Providence Office: Turk's Head Building



We have a booklet on This self aligning clamp when you write, its title is "Accurate Automatic Aligning."

Finishing MACHINERY

Sulphurous Acid Generator

Assures
A Uniform, Neutral Product

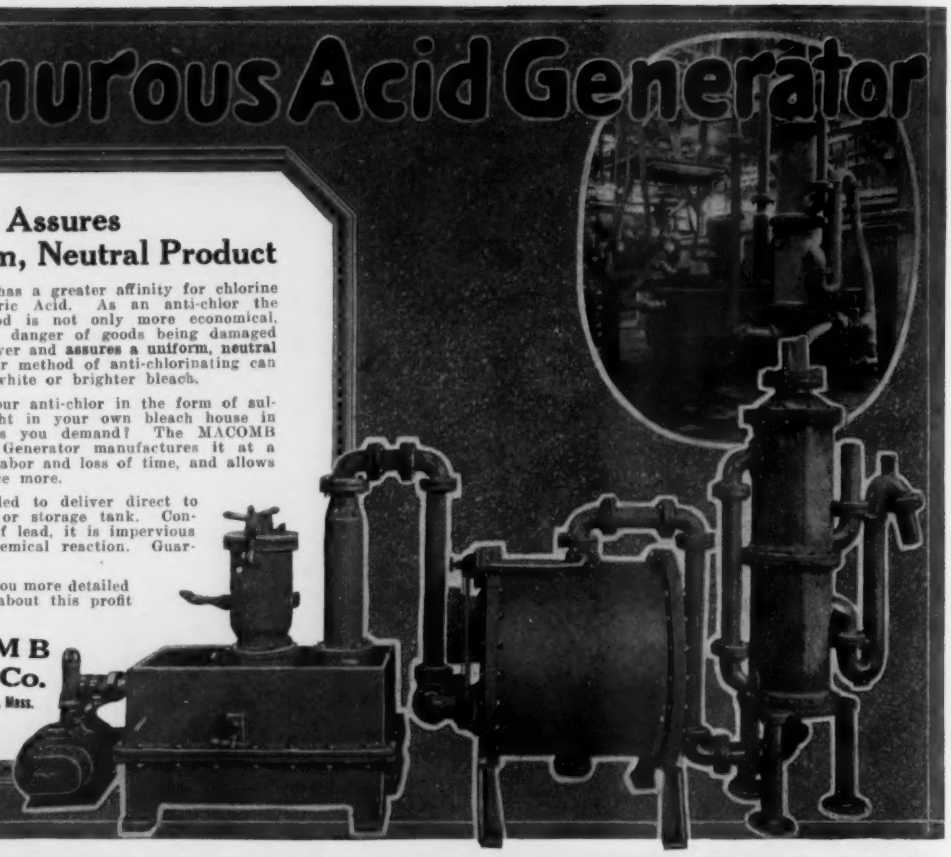
Sulphurous Acid has a greater affinity for chlorine than has Sulphuric Acid. As an anti-chlor the Sulphurous method is not only more economical, but eliminates all danger of goods being damaged or tendered on dryer and **assures a uniform, neutral product.** No other method of anti-chlorinating can produce as soft, white or brighter bleach.

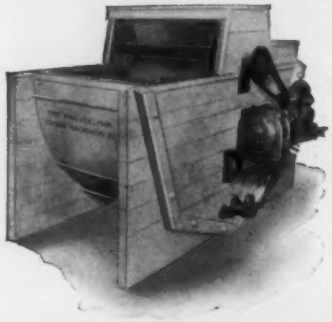
Why not make your anti-chlor in the form of sulphurous acid, right in your own bleach house in quantities only as you demand? The MACOMB Sulphurous Acid Generator manufactures it at a saving in power, labor and loss of time, and allows washers to produce more.

It can be installed to deliver direct to souring machine or storage tank. Constructed wholly of lead, it is impervious to destructive chemical reaction. Guaranteed gas-tight.

Let us send you more detailed information about this profit maker.

MACOMB Machine Co.
230 Newton St., Waltham, Mass.





"HURRICANE" PADDLE DYEING MACHINES

This Paddle Dyeing Machine is extensively used for dyeing and bleaching hosiery.

The machine is constructed entirely of wood, or if it is used for dyeing different colors, can be furnished with a monel lining and monel paddle.

Machines are built to hold 100 or 200 pounds, as desired.

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Especially designed to meet all requirements of Textile Mills.

Economical in upkeep.

Perfect satisfaction.

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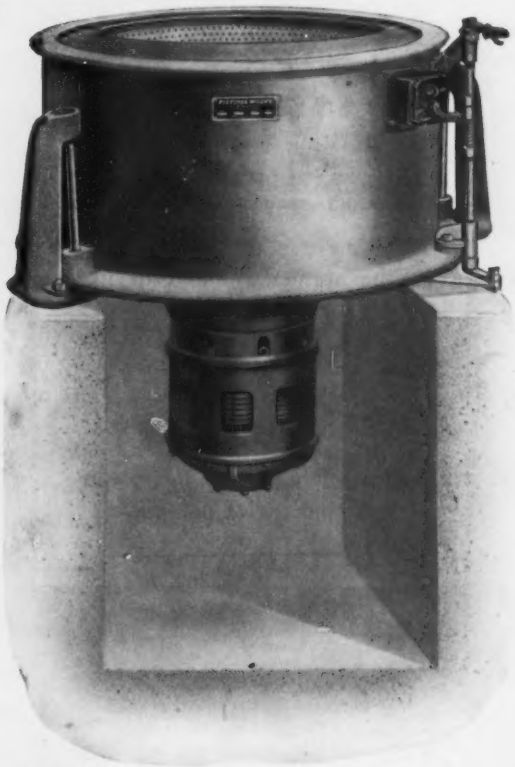

The Extractor with One Moving Part

The Only Dryer
With Framing Exclusively of Cast Iron

The SARGENT Dryer is the only dryer built in which the framing is made exclusively of cast-iron. This includes the sills, plates, studs and girts. There are probably more removable panels, thereby admitting ready access to any part of the interior of the drying chamber or coil box in the SARGENT DRYERS, than in any other make of machine. The panels of these dryers inclose in a double thickness of steel suitably framed, an insulation 1" thick.

To those contemplating the purchase of a dryer, we advise them to consider the Automatic Feed which is a part thereof, and compare the cast-iron sided model "M" or Model "L" Automatic Feed with any Feed made with a framing of angle iron.

These SARGENT Feeds are the same as used in connection with cotton openers, Pickers and such other machinery where an even feeding is desired by means of a a well designed strongly constructed feed, with spike apron and bottom apron and large containing hopper.

The SARGENT Dryer is regularly equipped with self-aligning ball bearing air circulating and exhaust fans.

Let us send you more detailed data. Write us.

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Graniteville, Mass.
FRED H. WHITE, Southern Agent,
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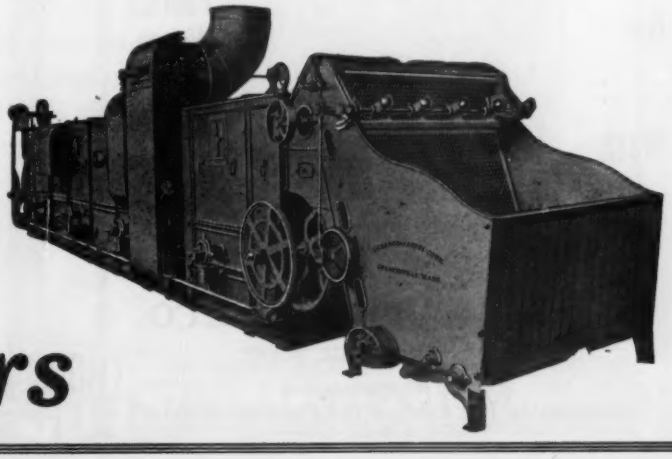

Sargent Dryers

Tycos

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INDICATING - RECORDING - CONTROLLING

In the application and drying of the size proper temperature controls are important. They must be accurate. *Tycos* Temperature Instruments are accurate as well as rugged.

A Request will bring you our general industrial catalog.

Taylor Instrument Companies
ROCHESTER N.Y.
There's a Tycos or Taylor Temperature Instrument for Every Purpose

DRYING MACHINERY

for Textile Raw Stocks, Yarns and Fabrics of all kinds—built and sold with the knowledge that we, the largest producers of dryers, have a reputation to maintain which necessitates our giving matchless value in equipment and service for the purchase price.

Write for a catalogue

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Formerly The Philadelphia Textile Mach'y Co.
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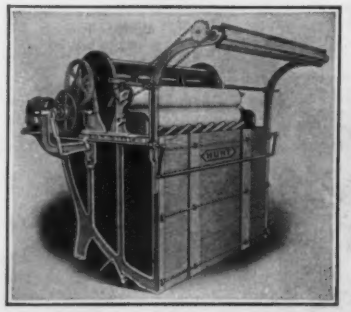
"Proctor" DRYERS
The best dryers in the world for TEXTILES

Rodney Hunt Equipment

Will Solve

Your Wet Finishing Problem

Bleach
Dye
Wash



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There are K-W machines in use which were built nearly half a century ago and which are still doing their work efficiently and economically under severe service. This is sufficient evidence of the durability and capability of K-W machines after long years of subjection to the ravages of live steam, heat and alkalis.

K-W Machinery, by its accomplishments, has steadily and irresistibly built up a reputation that has made the name "Klauder-Weldon" synonymous with the "world's best dyeing, bleaching and finishing machinery."

Our interest in upholding the K-W reputation means that you MUST be satisfied, and our suggestions to prospective purchasers are made with the view toward solving any dyeing, bleaching or scouring problem for all time. We will be glad to answer any and all questions without obligation on your part whatsoever.

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DYESTUFFS

Developed Colors
FOR
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Pontamine Diazo Scarlet A
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Pontamine Diazo Red 7 BL
Pontamine Diazo Bordeaux 7 B
Pontamine Diazo Blue M
Pontamine Diazo Orange
Pontamine Diazo Black BH Conc.

These dyestuffs as self-colors or in mixtures produce a range of exceptionally fast shades on cotton.

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WILMINGTON, DELAWARE

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Beam Bleaching and Dyeing
(Brandwood's Patents)

Up to twelve Beams, Bleached or Dyed at One Operation, Indigo, Vat, Napthol, Sulphur and Direct Colors.

Cost in labor and materials guaranteed less than by any other System.

We give definite guarantees in our Contracts as to cost of labor and materials and quality of work.

Users of our Bleaching and Dyeing Plants have the exclusive free benefit of Twenty United States Patents, giving great advantages in Warping, Bleaching, Dyeing, Drying, Quilling and Splitting, and not available by any other System.

We further give the use of valuable secret processes, and many years' practical experience. We start up the Plants free, and give free service at all times.

Reckoned on basis of production, our Plants are cheapest in first cost.

We are prepared to install Plants and take payment, as and when saved by their use.

Most of the Chambrays and stripes now manufactured in the U. S. and Canada, are bleached and dyed on our Plants.

Exclusive Patent Rights are still available for some States and Territories.

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Bleaching or Dyeing continuously in One Apparatus up to fifteen hundred pounds per hour, Indigo, Vat, Naphtol, Basic Developed, Sulphur and Direct Colors.

Cost in Labor and Materials guaranteed less than by any other system.

Dyehouse labor in handling the cotton before and after dyeing, and hydro-extracting is eliminated.

Three-fourths of the labor costs and three-fourths of the dyehouse floor space is saved.

Spinning production considerably increased.

No shortening, weakening or matting of the cotton.

Colors brighter and evenly dyed.

We give definite guarantees in our Contracts as to cost of labor and materials and quality of work.

We start up the Plants free and give free service at all times.

Exclusive Patent Rights are being granted to Colored Goods Manufacturers for their own State or Territory.

For full particulars apply to

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MATHIESON Chemicals

MATHIESON Chemicals are being used more and more by Southern mills because they assure absolute purity and uniformity. We can guarantee this as every ounce is made in our plants, where frequent tests prove the quality of the product throughout every step of manufacture. The Mathieson standard is rigidly maintained.

When you order from our Southern Office—in the very heart of the Southern textile industry—you get prompt delivery and lower freight rates as shipment is made at once from our plant at Saltville, Va., or from the nearest of our centrally located distributing points throughout the South.

Some of the Mathieson Chemicals most widely used in the South are:

LIQUID CHLORINE: A better, safer, 100 per cent. pure bleaching agent that gives the cloth a softer feel, a cleaner coloring and a greater tensile strength—no danger of goods yellowing or tendering.

BLEACHING POWDER: The highest and most stable bleach manufactured.

SODA ASH: 58 per cent. Pure Alkali—both light and dense. Shipments in bulk, bags and barrels.

CAUSTIC SODA: Th electrolytic 78 per cent. grade analyzing 99.70 per cent. Hydrate of Soda, is the purest caustic made. Also solid, ground or flaked, 76 per cent. and 74 per cent. grades.

BICARBONATE OF SODA: Purest grade, powdered and granular.

VIRGINIA SODA (Sesquicarbonate of Soda): A beautiful white chrystalline product, uniform in character and action. A superior neutral textile soda for washing and scouring.

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The Grasselli CHEMICAL CO.

ESTABLISHED 1839 CHEMICALS ZINC GRASSELLI EXPLOSIVES DYESTUFFS

Dyestuff Dept 117 Hudson St. New York, N.Y.

KATIGEN DEEP BLACK GGN CONC.

The Ideal Sulphur Black for Hosiery

The Grasselli line of sulphur colors offers a wide range of products suitable for raw stock, machine or piece dyeing.

Through the use of these colors practically all shades possible of production by the sulphur group may be obtained.

Shades matched and quotations furnished promptly.

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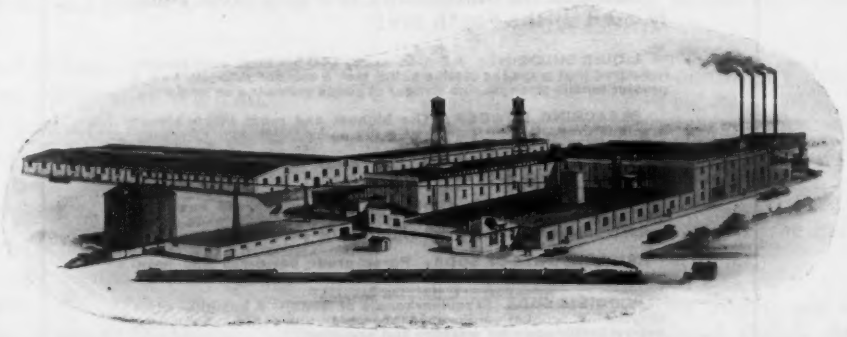

VICTOR MILL STARCH

The Weaver's Friend

It boils thin—it penetrates the warps—increases breaking strength and carries the weight into the cloth. Being thoroughly washed free of gluten and other foreign matter it gives a bleach and finish to the goods that you can get from no other starch.

A trial order will convince you that VICTOR STARCH has no equal on the market.

THE KEEVER STARCH COMPANY, Columbus, Ohio

Southern Agent: MR. JAMES H. MAXWELL, Greenville, S. C.

If you are not already using VICTOR STARCH call on our representative for a demonstration at your convenience.

Starch

EFFICIENCY and ECONOMY are the watchwords today. Modern mill men who hold to this motto are discarding ordinary, imperfectly refined starches and selecting those special types best suited for their individual conditions.

Some desire increased weight, all need increased strength and better weaving qualities for the warp.

You know the result you seek.

We know and can provide the proper type of starch.

400 MILL
500 MILL

FAMOUS N
C. P. SPECIAL

BLUE RIVER CRYSTAL

BLEACHING and FINISHING PLANTS have learned that "any old" STARCH or DEXTRINE will not do the work. To secure the proper "feel," the desired weight, the attractive finish, careful discrimination must be exercised in selecting

STARCHES and DEXTRINES

We manufacture all approved varieties

90 THIN BOILING CRYSTAL

162 GUM 163 GUM

DEXTRINES and BRITISH GUMS

Corn Products Refining Company

New York

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Manufacturers of

CHEMICALS

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Specialties

LYKOPON — Concentrated Hydrosulphite for reducing Indigo and vat dyes.

FORMOPON—For discharge work.

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Works: Bridesburg, Philadelphia, Pa.

Manufacturers of

Concentrated Sodium Sulphide

Crystal Sodium Sulphide

Also manufacturers of the following chemicals:

ALUM	GLAUBER SALT
SULPHATE OF ALUMINA— Iron Free	OIL OF VITRIOL
	NITRIC ACID
PAPER MAKERS' ALUM	MURIATIC ACID
WATER FILTRATION ALUM	NITRATE OF LEAD

Represented by

The MAKENWORTH COMPANY

Greensboro, North Carolina

Established 1815

ARNOLD HOFFMAN & CO., Inc.

Providence New York Boston Philadelphia Charlotte

Oldest in Years. Youngest in Spirit
Modern in Ideas. Progressive in Methods
"Service" Our Motto

All kinds of
Warp Dressings, Finishing Materials, Soaps,
Soluble Oils, Etc.

Please Submit Your Problems to Us

"DEVELOPENE"

Leaves No Argument as to When
"BLACK IS BLACK"

WHY BE SATISFIED

with a RUSTY BLACK when you can have a RICH LUSTROUS BLACK by finishing your Hosiery with the latest, most efficient and satisfying patented preparation

"DEVELOPENE"

A Demonstration Will Convince You

Send us a pair of unfinished stockings, skein of yarn or a piece of fabric—cotton, silk, artificial silk, wool or mixes—which has been dyed black, washed, but not finished. We will finish it with "DEVELOPENE" and return to you.

There will be such an improvement that you will immediately want "DEVELOPENE" for finishing your goods.

No further softener—or soap—required. Makes hosiery slip on and off the board easily—leaves the product soft and pliable.

Kali Manufacturing Company

Manufacturing Chemists

1404-10 No. Front St. Philadelphia, Pa.

Sole Manufacturers of

Hydroxy Oil and Kali Chlorine Neutralizer

"BRETON"
MINEROL "F"

For

Cotton Raw Stock

"It reduces the waste in carding"

BORNE, SCRYMSER CO.

Established 1874

80 South Street, NEW YORK

BOSTON **PHILADELPHIA**

Works: Elizabethport, N. J.

Increases Production

Staley's

Staley's Eclipse Thin Boiling Starch speeds up production through better weaving. Strength of yarn is increased 10% to 15%—maximum weight is added without harshness — shedding at the looms is reduced to a minimum. Time is saved in cooking because of the absence of big crystals. No pressure kettles are required. There are other Staley Starches that meet perfectly special requirements. Our facilities for scientific research are unsurpassed in the textile industry.

Write for samples and prices.

A. E. STALEY MFG. CO.
DECATUR, ILL.
508 Andrews Law Bldg.
Spartanburg, S. C.
J. W. POPE
Care Ansley Hotel, Atlanta, Ga.
88 Broad Street, Boston, Mass.
25 Church St., New York City, N. Y.

Absolutely Uniform

Starch

NEW LEAFLET ON KIER BOILING

Send For It Today!

Scientific information that should be in the hands of every mill man.

Address

SOL-ESCO

Lockport, N. Y.

Electric Smelting & Aluminum Co., Inc., Sole Mfrs

Christmas Greetings

Because the spirit of Chistmas is founded on the fact that the most universal principle of life is the kinship of humanity, this thought causes the business world to pause and take inventory of the moral and spiritual values both social and commercial.

On Christmas Day we focus this spirit of brotherhood; petty differences vanish and a common ground of fraternity and fellowship touches our lives with broader values, and the urge of service.

This season, too, affords an opportunity to emphasize these spiritual factors. Service, courtesy and good will are each given their place and the warm personal touch of brotherhood invests us with a broader life.

With this spirit we join with you in the heartiest Holiday Greetings and look forward with you to a continuance of those happy relations which have made our business contact such a real pleasure.

THE J. B. FORD CO.

WYANDOTTE MICHIGAN

JACQUES WOLF & CO.

Manufacturing Chemists and Importers

PASSAIC, N. J.

ALL FINISHING and SIZING PRODUCTS for COTTON

ANTISTAIN

MONOPOLE OIL

Reg. Trade Mark No. 70991

BLEACHING OIL

Kier boil Assistant

HYDROSULPHITE

For stripping and discharge printing

CREAM SOFTENERS

ALIZARINE ASSISTANTS

Uniform in Application

VICTROLYN

Penetrating, Lubricating, Dependable Assistant in Warp Sizing

KLORASENE

will remove Oil Stains.

If you are troubled, write us.

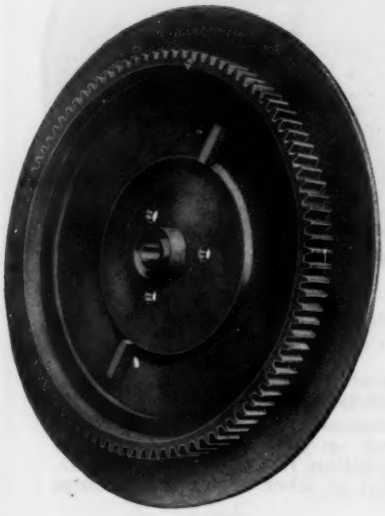
BOSSON & LANE

Manufacturing Chemists

ATLANTIC, . MASS.

All Steel Loom and Section Beam Heads

Mill Executives are Specifying All Steel Heads on New Equipment.



PATENTED

STEEL heads represent permanent equipment. The first cost is the only cost.

Once installed all expense of maintenance is eliminated.

GUARANTEED not to bend or spring under pressure of warp or handling of beams. Constructed to duplicate present cast-iron heads.

Ask for samples.

PATENTED

Mossberg Pressed Steel Corporation

Attleboro, Mass.

Southern Representative:
Southern Textile Specialty Co., Greenville, S. C.

Satisfaction

IN

Roller, Clearer and Slasher Cloths

Our Roller Cloths are made of the right material with exactly the correct cushion and uniformity of surface to produce the most desirable results.

Clearer Cloth is constructed of high grade material with thick, strong nap that does not pull out and its uniform length is such that the rolls are completely cleared of all short fibre.

Our Slasher Cloth is made of the best material of sufficient cushion and porous to thoroughly force the sizing into the yarn.

In combination with superior quality products is prompt service and right prices.

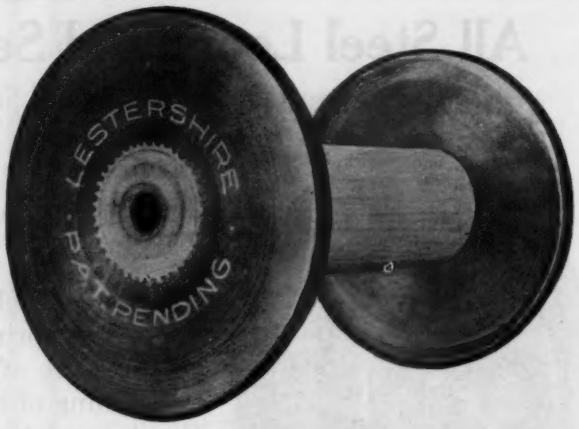
Let us send you a trial order. Write us.

PHILADELPHIA FELT COMPANY

FRANKFORD, PHILADELPHIA, PA.

Southern Sales Agent: M. C. Sanders, Greenville, S. C.

What Part of the Spool is First to Wear Out?



Your superintendent will confirm our statement that 99% of all Warper, Twister or Spooler Spools become useless on account of the heads breaking, wearing rough or loosening. This is true of all types of Spools heretofore on the market.

With the Lestershire Type Vulcanized Fibre Head Spools just the opposite is true. The Heads will outwear the barrels because Hard Vulcanized Fibre (the same material from which end thrust bearings and automobile gears are made) will never break, wear rough nor splinter.

Of course the first cost is higher but, figuring your charges per thousand spools per year, they are by far the most economical spools on the market today.

In addition Lestershire Fibre Head Spools will in the ordinary mill give you an increased unloading production of nearly 50%. Put a row on your creel and compare the time necessary to unload with any other type Spool.

On the smooth Rock Maple barrel, cleanly jointed to the Fibre Heads which cannot get rough and cannot be dented, there is no place for the yarn to catch.

Spindle wear is also eliminated by bushings of hard well seasoned Dogwood.

Increased traverse can be had which will give you greater yardage on your spools. This means a saving of many dollars in the course of a year, not only direct but in labor required to change the spools.

At your request we will gladly send samples for purposes of test and comparison.

LESTERSHIRE SPOOL & MFG. CO.

Manufacturers Mill Spools, and Bobbins, of Every Description

JOHNSON CITY, N. Y.

EVERY Textile Man should have these reference books. They cover in a detailed and thorough manner all calculations necessary to be made on any cotton mill machinery manufactured in the United States and constitute one of the best references on this subject obtainable.

The two volumes are illustrated with 45 diagrams and contain 21 reference tables.

As the value of a book lies in its contents and not in a fancy cover, we have put these two volumes out in a strong, serviceable paper binding. You can secure them in conjunction with a subscription to COTTON.

Write for circulars and full information.

WALTER L. PARKER CO.

LOWELL, MASS.

Manufacturers of Bobbins, Spools and Skewers

OUR SPOOLS:—

Are made to stand severe service and are made from thoroughly dried stock, so constructed that they are giving entire satisfaction.

OUR BOBBINS:—

Are made from the best grade of stock, and through the efficiency of our workmanship, are true running, and properly fitted on spindles.

OUR PRODUCTS:—

Bobbins—Warp and Filling. We put on all kinds of metal shields and caps.
Speeders—Plain; steel rings; metal base.
Spools—Warper; Twister.
Our Metal Bound Spools are pronounced the best on the market.
Skewers—Cop, Warper and Roving, of all descriptions.
Twisters—Universal Winder Rolls and Bobbins, Comber Rolls, etc.

We Specialize in New Mill Equipment

CHARLOTTE SUPPLY CO., SOUTHERN AGENTS.

Can you do this with your Beams?

The shaft in this type of Beam is easily removed allowing it to stand upright on the Heads.

When shipped this way the heads bear against one another. No burlapping, less space used. Easier handled

Patent Wooden Beam Heads do not break or bend. The answer is

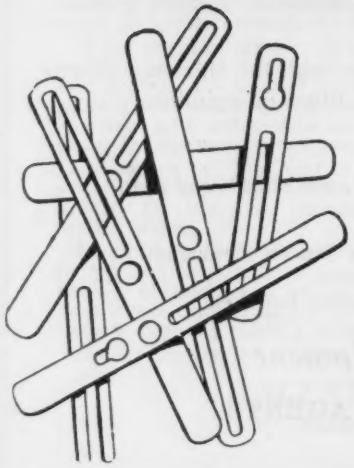
They are the best

Place a trial order and see yourself.

ALLEN COMPANY, New Bedford, Mass.

Catalog on request.

GREIST



Satin Finish Loom Drop Wires
are *Good Wires*

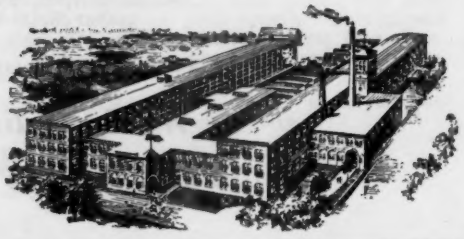
Uniformly made—free from burrs
a reliable source of supply.

The Greist Manufacturing Company,

Dept. "C,"

New Haven, Conn.

Southern Representative
The G. G. Slaughter Machinery Co.
Greenville, S. C.



SPINNING RING SPECIALISTS SINCE 1873

SPINNING RINGS
TWISTER RINGS
SILK RINGS

DIAMOND FINISH

TRAVELLER CLEANERS
TRAVELLER CLIPS
GUIDE WIRE SETS

WHITINSVILLE SPINNING RING CO.
WHITINSVILLE, MASS.

WASHBURN

KORE-LOK PIN BOARDS

"The Old Bobbin Boxes are going"

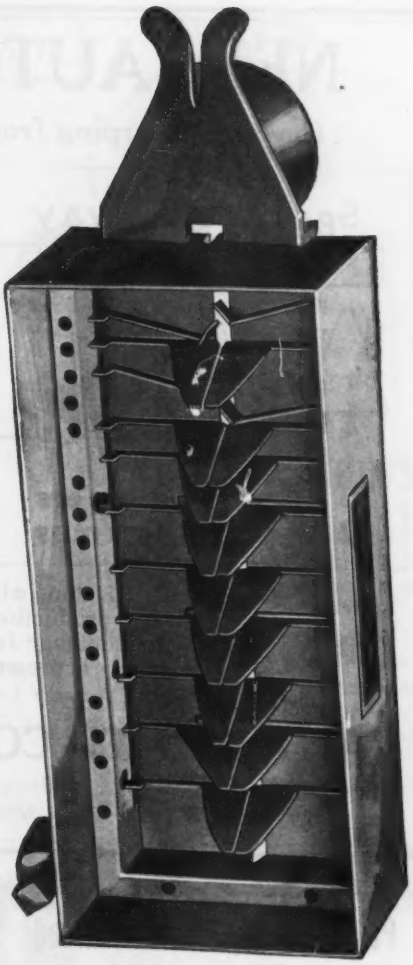
This cut shows a type of pin board construction which has successfully replaced bobbin boxes on looms.

There is a "Kore-Lokt" Pin Board to fit every textile need. Other styles are fitted with hollow or solid steel pins, with wire pins and with special wood pins, but in every type the Kore-Lokt principle is retained.

Be modern. Always consider your doffing problems in terms of pin boards. They are indispensable in measuring and controlling the operation of automatic looms. They answer every doffing requirement throughout the mill.

We invite superintendents and overseers to correspond with us concerning pin board systems. Let us send you a list of prominent mill users, each and every one of whom considers pin boards an essential factor in their success.

NEW BEDFORD MASSACHUSETTS



The Eclipse
AUTOMATIC YARN CLEANER

An entirely new principle is involved in that the yarn is cleaned by **flexible** blades which vibrate **constantly.** This device is small and compact and easily attached. The strength and elasticity of the yarn is not affected in the slightest.

When writing, state make of spooler or winder.

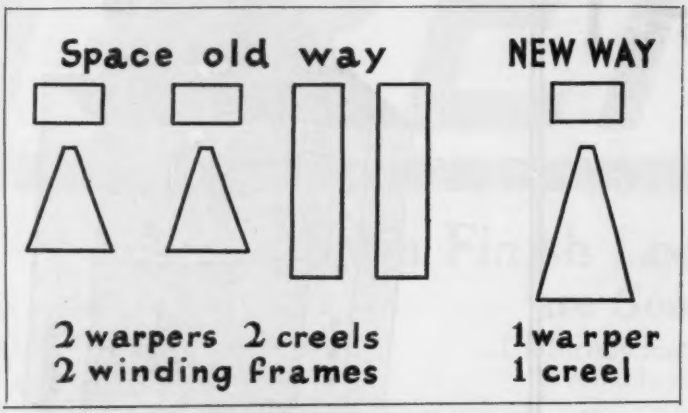
ECLIPSE TEXTILE DEVICES, INC.

ELMIRA, N. Y.

Makers of
Automatic Yarn Cleaner
Automatic Stop Motion
Yarn Tension Device

NEW AUTOMATIC CREEL

for direct warping from FILLING WOUND BOBBINS



COMPLETELY ELIMINATES the

Spooling of the yarn

Spooling waste

Undue and irregular tension of yarn due to spooling

Stoppage for doffing

Doffing is done while warper is running.
Greater production from better warps at lower cost.
Better loomage from auto-creel warps because
Elasticity is preserved in yarn.

For Information address

AUTO CREEL CORPORATION, NEW YORK

Room 915, Fifth Ave. Building
Alfred Suter, Sales Manager

The Palmer Adjustable Thread Guide

For Ring Spinning and Twisting Frames

Easily Adjusted.

Extreme accuracy and permanence of setting.

Cheapest of them all.

Mail guide-block for free sample.

Patented and manufactured by

THE I. E. PALMER COMPANY

Middletown, - - - Connecticut

1923 IS ALMOST HERE

New Year's (after December) you start a clean page

How about CLEAN FLOORS

Begin with SAVOGRAN and a year from now compare your 1923 cleaning cost with that of 1922.

If you are interested in cleanliness you are interested in SAVOGRAN.

INDIA ALKALI WORKS

India Wharf Boston, Mass.

Ask your supply house about it.

The magnified portion shows the detail of the Atlanta Brush Company peg construction which absolutely prevents the bristles from becoming unseated.

We Also Do the Best Repair Work

You are just as much interested in getting high grade repair work as you are in securing good brushes when you buy them new. And so are we.

Our repair department is manned by the same skilled labor, the same equipment and receives the same careful attention as we give to the manufacture of new brushes.

We use the best grades of stock and are just as painstaking in having every tuft of bristles seated so they will stay in place as if we expected to use the brush ourselves.

It is this kind of work that has placed our brushes in nearly every textile mill in the south and we value our repuattion too highly for it to be jeopardized by the repair department.

Send us your brushes of all kinds for repairs and they will have our very best attention.

Atlanta Brush Company
Atlanta, Ga.

ATLANTA BRUSH COMPANY

A Brush for every Textile Need

CLEAN FLOORS
in American Business

If You Had to Scrub the Floors!

How long would you crawl along in a sea of dirty suds, slopping dirty water in and out of a pail—scrubbing dirt with dirt?

You would soon find a *better* way—and an *easier* way—not just because you dislike such labor, but because your sense of economy and efficiency would be shocked at such an antiquated and wasteful method.

EQUITABLE LIFE BUILDING
New York City
Where FINNELL scrubbed floors are a recognized service to tenants.

Then why let your employees do it? It is an expense to you in time, labor and results, no matter *who* does it.

Investigate *electric* scrubbing, the easier, better, modern way. Learn what it can do for you.

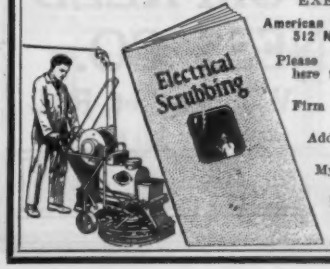
Send for "Electrical Scrubbing"

Mail memo or have your secretary send for this booklet describing the invention and perfection of a complete system of Electric Scrubbing.

AMERICAN SCRUBBING EQUIPMENT CO.
General Offices and Factories
HANNIBAL, MO.
District Offices in Principal Cities.

"Clean Floors Reflect Clean Business"

FINNELL SYSTEM
OF ELECTRIC SCRUBBING



EXECUTIVE'S MEMO.

American Scrubbing Equipment Co.
512 N. Collier St., Hannibal, Mo.

Please send brochure shown here to

Firm Name .....

Address .....

My Name .....

Title .....

Are you reducing your clearer waste?

KORITE "T" will do it

IT OVERCOMES the licking up of the fibre, increases the durability of the roll.

Preserves and strengthens the leather, keeps the rolls clean, prevents slipping.

Improves the spinning quality.

* * * * * *

MANY mills are now using this treatment of their top rolls and show above results.

It is colorless and will not injure the yarn. It can be applied directly to the roll while running in frame.

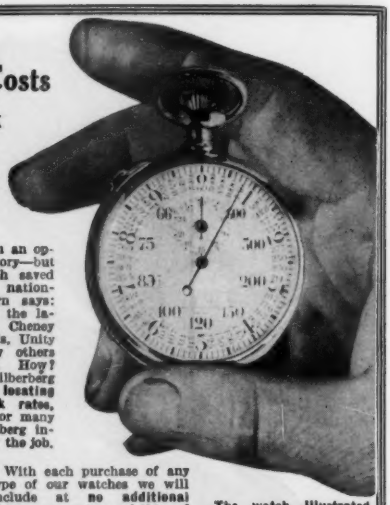
Full particulars on request to Textile Department

KORITE PRODUCTS, INC.
31 Ames Street, Cambridge, Mass.

Obtain Standardized Costs

Set Piece Work Rates

Here's the Watch for Every Textile Time Study Job.



Only six seconds waste on an operation in an eastern factory—but locating it with the watch saved thousands every year. A nationally known Textile concern says: "We eliminated one-fourth the labor, cut costs by 22%." Cheney Bros., Champlain Silk Mills, Unity Spinning Mills and many others are doing the same thing. How? By Time Studies with Silberberg watches. **Whether it's locating wastes, setting piece work rates, establishing bonus systems** or many other uses—there's a Silberberg instrument specially made for the job.

With each purchase of any type of our watches we will include at **no additional charge** one set consisting of our 3 Text Lesson Course on "TIME AND MOTION STUDY" including how to set **Piece Work Rates** and how to obtain accurate **Labor Costs.** All data contained therein broadens the scope and use of Time Study Watches in the Industries.

This course regularly sells for $10.00. **Absolutely FREE with each Watch.** Send for illustrated pamphlets and catalogues. **Any of our instruments on approval to responsible concerns.**

The watch illustrated at the top with the decimal dial and "take out time" features gives direct readings in production per hour up to one minute jobs.

The Decimal Duration Watch—Gives production figures up to three minute jobs with special arrangements for timing jobs up to 30 minutes. It also has the decimal dial and "take out time" feature

MORTIMER J. SILBERBERG CO.
Peoples Gas Bldg. CHICAGO
Pioneers in the Manufacture and Sale of Time Study Watches.

The Master Chronograph

REEDS

For Cotton, Woolen, Worsted, Silk, Tire Fabrics, Webbing, and Wire Cloth.

We make a specialty of all Metal reeds, for Tire Fabrics, and Leno work.

HAYES LOOM REED & HARNESS CO.

182 Farm St. Woonsocket, R. I.

AMERICAN SUPPLY COMPANY

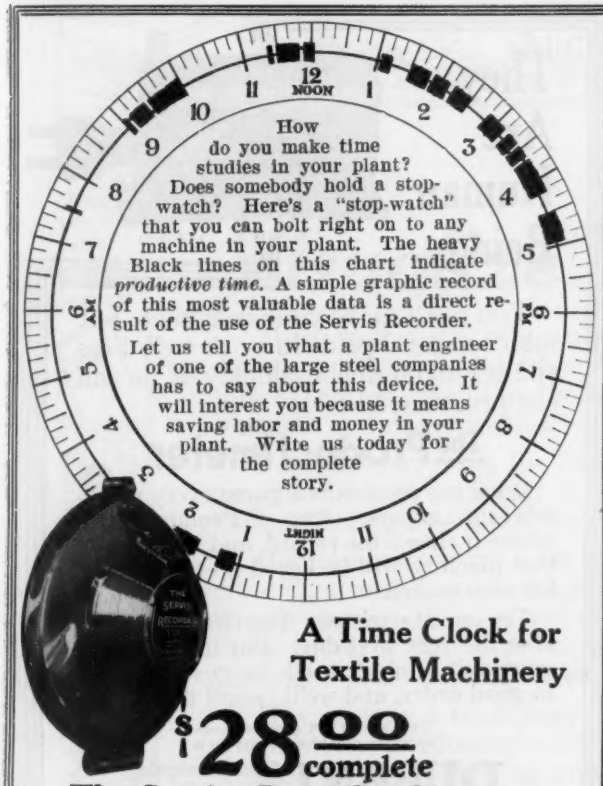
PROVIDENCE, R. I.

MANUFACTURERS OF

Loom Harness,
Weaving Reeds,
Oak Tanned Leather
Belting, Strapping,
Etc.

We make a specialty of Harness for Warp Drawing Machines

NOTE—No orders too large for our capacity. None too small to receive careful attention.


How do you make time studies in your plant? Does somebody hold a stop-watch? Here's a "stop-watch" that you can bolt right on to any machine in your plant. The heavy Black lines on this chart indicate productive time. A simple graphic record of this most valuable data is a direct result of the use of the Servis Recorder.
Let us tell you what a plant engineer of one of the large steel companies has to say about this device. It will interest you because it means saving labor and money in your plant. Write us today for the complete story.
12 NOON
12 MIDNIGHT
AM
PM

A Time Clock for Textile Machinery

$28.00 complete

The Service Recorder Company

Cleveland

MEECO

Metal Equipment For Shop And Factory

DRINKING FOUNTAINS

The Standard for 15 Years

Fig. 604 ICE-COOLED

Eleven Other Types From Which To choose

SANITARY—DURABLE—EFFICIENT—LOW IN COST

Write for catalog and new price list.

MFG. EQUIPMENT & ENG. CO.

FRAMINGHAM, MASS.

SCOTT TESTERS

THE SCOTT HORIZONTAL 800 LBS. CAPACITY—INCLINABLE BALANCE FABRIC TESTER

An American Invention, Built in America by Skilled American Mechanics and adopted as the Standard for testing all heavy fabrics for American requirements.

We also build the Standard Testing Machines for Light Fabrics, Yarns, etc.

HENRY L. SCOTT & CO.

BLACKSTONE & CULVER STS., PROVIDENCE, R. I.

BEST—

1. for handling yarns in skeins, on spools or cones, and transferring from ribbing and knitting departments.
2. for shipping yarns finished or unfinished.
3. for special routing of yarns or stock through various departments.
4. for storage (without casters).

We have never failed to save money for the mill when a textile handling problem was put up to us. Lay your problem before us and we will gladly offer suggestions. Write today for our "Bulletin on Trucking in Textile Mills."

G. B. LEWIS COMPANY

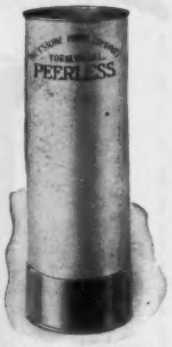
BOX TRUCK DIVISION C-15

WATERTOWN, WISCONSIN

John Cronin, 13 Hamilton St., Boston, 25, Mass.; Mill Specialties Co., 439 Arch St., Philadelphia, Pa.; W. Gracey, 230 Broad St., Spring City, Pa.; E. C. Buehrer Co., 18 Front St., San Francisco, Cal.; J. D. Collins Sales & Engineering Co., 55½ Luckie St., Atlanta, Ga.; R. E. Stanton Equipment Co., 615 Ryan Annex, St. Paul, Minn.; R. B. Street & Co., Inc., 28 N. Clinton St., Chicago, Ill.; Edw. L. Koenig Co., 23 W. Kinzie St., Chicago, Ill.—Detroit address—Ryerson Bldg.—Milwaukee address—114 Grand Ave.—Alvin Lovingood, 14 Walker St., Atlanta, Ga.

LEWIS Box Trucks

KEYSTONE
"Peerless" Seamless
ROVING CANS



Withstand the wear of long, hard service.

That's because they're made of Keystone Fibre—well seasoned and flawless. Noted for its strength and durability.

They are light in weight, easily handled, and retain their smoothness.

The reinforced bottom is kick proof.

Keystone Holloware for mills is the most economical to use. Write for booklet describing full line.

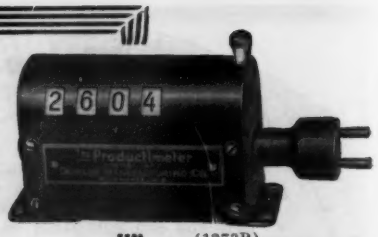
Orders filled through any responsible mill house, or direct.

KEYSTONE FIBRE COMPANY

BOX 349, WILMINGTON, DELAWARE

Southern Representatives: Wilson Company, 408-409 News Bldg., Greenville, S. C.; New York Office, 30 Church St.; Chicago Office: 565 West Washington Blvd.; Philadelphia Office: 7 South 17th St.; Boston Office: 176 Federal Street.

They Are Human Beings



(1373B)

You can't drive your workmen, but man's natural pride in work well done spurs him on unconsciously, if he can see progress.

The Productimeter

Breaking records is a game every mother's son enjoys. Put a Productimeter where it shows the record, and the man on that machine will be keyed up to breaking his own record.

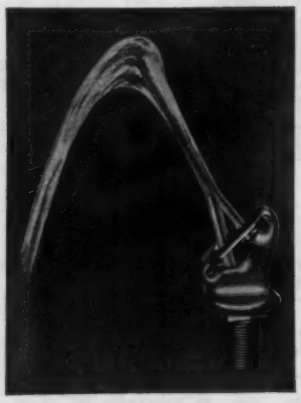
Try one at our risk. The effect is noticeable the very first day. But if in 30 days you don't think it worth the cost, return it in good order, and we'll cancel the charge.

Our Catalog will give you some valuable pointers. Write for it

DURANT Manufacturing Company

633 Buffum Street, Milwaukee, Wis.

At 60 Pounds Pressure or 20 Pounds



The Halsey Taylor Stream is ALWAYS THE SAME.

Line pressure varies—down one second to 20 pounds and up to 60 the next and the drinker gets a good splash in the face when it changes, or water is thrown onto the floor—UNLESS he is drinking from a Halsey Taylor Drinking Fountain.

In Halsey Taylor Drinking Fountains, the very latest and the very highest development in fountains, the stream never varies — NEVER TOO HIGH — NEVER TOO LOW—it always flows smoothly, evenly and provides a comfortable, convenient, refreshing and sanitary drink.

Your workman needs these advantages and the most positive assurance you have getting them is to install Halsey Taylor Drinking Fountains with the Automatic Stream Control and The Perfect Drinking Stream.

There is a Halsey Taylor type for every purpose—there's one to suit your exact needs.

Write for literature and make your selection.

The Halsey W. Taylor Co.

538 No. Park Ave., Warren, Ohio.

THE "Southwestern Iron Clad"
Is the IDEAL Cotton Mill Broom

Only the best grade of broom corn is used in these brooms—they are built strong and will withstand the hardest usage.

The light weight, yet strong and substantial shields used gives the broom ample protection and at the same time allows the proper amount of broom corn to be used, thus giving them excellent sweeping qualities.

MADE RIGHT! PRICED RIGHT!

Inquiries and orders receive prompt attention.
Sold direct and through all principal distributors.

The Southwestern Broom Mfg. Co.
Evansville, Indiana

Let Us

Visualize Your Ideas

Most wide-a-wake business men are constantly originating ideas, sales and advertising plans, which, if carried into execution, would be the means of producing improved business and greater sales.

Possibly you have the ideas which you have failed to use, the lack of technical knowledge covering advertising and publicity plans alone discouraging you.

Our occupation for over 23 years has been that of the crystalization of publicity plans for others. With a thoroughly equipped, most complete plant furnishing "anything and everything for the advertiser" we can carry your ideas into practical and successful execution.

May be it is a trade-mark, a slogan, literature or some special form of illustration, or perhaps it is a long needed treatise or exposition of your plant, your product, your service. Whatever it is, our artists, ad-writers, engravers, electrotypers, printers,—in short, our advertising experts —will gladly carry your ideas into execution and further improve them by the production of new ideas, the conception of better expression and of new thought.

Whatever your problem is, write us.

JACOBS & CO.

Advertising, Commercial Art, Commercial Photography, Photo-Engraving, Electrotyping, Nickeltyping, Stereotyping, Fine Half Tone and Color Process Printing.

Home Office and Factory—

Clinton, S. C.

The Shifting Mechanism Is Important

It makes a difference whether you have to lift a carriage or just a segment.

Ball Bearing Long Wearing

In shifting to write capitals and figures on an L. C. Smith & Bros. typewriter, you touch the shift key and shift the type segment—not the entire carriage.

This is the reason why your wide carriage machines shift just as easily as the regular correspondence size.

The segment shift is on ball bearings and works easily and exactly. The printing point is always stationary when the type strikes the paper.

This is only one of the many mechanical features in which the L.C. Smith & Bros. Typewriter excels.

L. C. Smith & Bros. Typewriter Co.
Home Office and Factory, SYRACUSE, N. Y.
Branches in all Principal Cities.

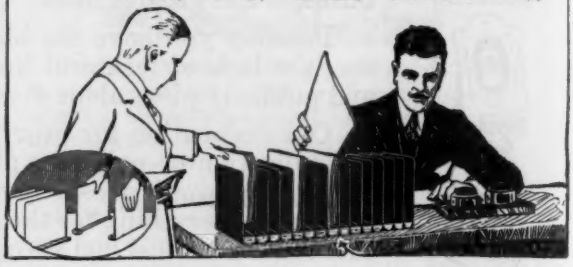
Save time distributing papers
Kleradesk

Automatically sorts and routes mail, memos, orders, etc., for all to whom mail is distributed. It holds reference papers immediately at hand when needed. Very convenient.

A Steel Sectional Device

Add compartments as required. Sections 75c each. Fifteen-compartment Kleradesk illustrated below only $12.00. Indexed front and back. Write for free, instructive folder, "How to Get Greater Desk Efficiency."

Ross-Gould Co., 318 N. 10th—St. Louis
New York, Chicago, Cleveland, Philadelphia (8)



PRINTING

WE do it for some of the largest mills in the South—*Why not for yours?*

If our prices and service were not right, we could not do it.

THE A. J. SHOWALTER COMPANY
Dalton, Georgia.

VOGEL
PATENTED

Frost Proof Closets

350,000 giving satisfaction. Save Water; Require no Pit; Simple in the extreme. The most durable water closet made. In service winter and summer.

- Enameled Roll flushing rim bowls.
- Heavy brass valves.
- Strong hardwood seat.
- Galvanized tank.
- Malleable seat castings will not break.
- Tested under hydraulic pressure before leaving factory.

ASK YOUR JOBBER

JOSEPH A. VOGEL CO.
WILMINGTON
DELAWARE

This is

Re-Fil-It Broom

Number 3

equivalent in bulk, but superior in service, to a standard stitched broom number 8.

One Re-Fil-It holder will outwear *many* sets of fillers.

No material to break over the shoulder.

No stitches to break, allowing the broom to become useless.

Please send to us for pamphlet which gives prices and all information.

Re-Fil-It Broom Mfg. Co.

185 Devonshire St. Boston, Mass.

"Lips That Touch"

the fountain head expose all who drink to illness and disease.

150 Days Are Lost

Each Year by Every Fifty Employees

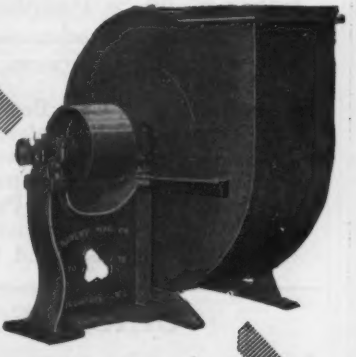
largely through infection from contact with disease-covered parts of the old style bubbling fountains.

VERTICO-SLANT
Drinking Fountains

force the stream of water to fall to one side—affording no resting place for the lips—thereby preventing all danger of infection from this all too prevalent source.

Write today for particulars.

RUNDLE-SPENCE MFG. COMPANY
MILWAUKEE, WIS.



The Fan With Replacement Floats

Floats that are double angle supported, and riveted to, machined center, not cast into a hub.

The ***Bayley*** **B**

Exhaust Fan

The perfectly balanced fan that has reduced breakdown shutdowns to be lowest possible minimum. Handles sawdust, shavings, ashes or gases with equal efficiency. What users say about it is the most convincing argument in its favor. Send for bulletin today.

Bayley Mfg. Co., Dept. I.
Milwaukee, Wisconsin.

EXCELLENT THROUGH TRAINS

VIA

Southern Railway System

TO

FLORIDA

"SUWANEE RIVER SPECIAL"
To the West Coast

Southbound					Northbound	
11:45	a.m.	Lv.	Detroit	Ar.	3:55	p.m.
1:35	p.m.	Lv.	Toledo	Ar.	1:43	p.m.
11:05	a.m.	Lv.	Cleveland	Ar.	3:55	p.m.
8:10	p.m.	Lv.	Cincinnati	Ar.	7:15	a.m.
8:10	p.m.	Lv.	Louisville	Ar.	7:40	a.m.
11:25	a.m.	Ar.	Atlanta	Lv.	4:00	p.m.
11:45	a.m.	Lv.	Atlanta	Ar.	3:20	p.m.
5:30	a.m.	Ar.	Tampa	Lv.	11:10	p.m.
7:55	a.m.	Ar.	St. Petersburg	Lv.	8:40	p.m.
7:12	a.m.	Ar.	Bradentown	Lv.	7:30	p.m.
7:45	a.m.	Ar.	Sarasota	Lv.	7:00	p.m.

Through Sleeping Cars Between
Detroit-St. Petersburg
Cleveland-St. Petersburg
Louisville-Tampa
Cincinnati-St. Petersburg
Cincinnati-Sarasota
Dining Car and Coaches

"ROYAL PALM"
To the East Coast

Southbound					Northbound	
9:00	p.m.	Lv.	Chicago	Ar.	7:05	a.m.
2:45	a.m.	Lv	Indianapolis	Ar.	12:30	a.m.
10:00	p.m.	Lv.	Detroit	Ar.	7:40	a.m.
11:45	p.m.	Lv.	Toledo	Ar.	5:25	a.m.
8:00	p.m.	Lv.	Cleveland	Ar.	7:20	a.m.
5:45	a.m.	Lv.	Cincinnati	Ar.	9:15	p.m.
8:40	p.m.	Ar.	Atlanta	Lv.	6:20	a.m.
8:55	p.m.	Lv.	Atlanta	Ar.	6:05	a.m.
7:55	a.m.	Ar.	Jacksonville	Lv.	9:05	p.m.

Through Sleeping Cars Between
Chicago-Jacksonville
Indianapolis-Jacksonville
Cleveland-Jacksonville
Detroit-Jacksonville
Toledo-Jacksonville
Dining Car and Coaches

"OHIO SPECIAL"

Southbound					Northbound	
11:40	p.m.	Lv.	Chicago	Ar.	7:50	a.m.
5:05	a.m.	Lv.	Indianapolis	Ac.	2:25	a.m.
8:15	a.m.	Lv.	Cincinnati	Ar.	8:55	p.m.
6:25	p.m.	Lv.	Chattanooga	Ar.	10:50	a.m.
11:10	p.m.	Ar.	Atlanta	Lv.	6:05	a.m.
11:25	p.m.	Lv.	Atlanta	Ar.	5:50	a.m.
3:05	a.m.	Lv.	Macon	Ar.	4:20	a.m.
11:15	a.m.	Ar.	Jacksonville	Lv.	8:15	p.m.
6:15	p.m.	Ar	Tampa	Lv.	1:00	p.m.
8:40	p.m.	Ar.	St. Petersburg	Lv.	10:30	a.m.

Through Sleeping Cars Between
Chicago-St. Petersburg
Cincinnati-Jacksonville
Dining Car and Coaches

"KANSAS CITY-FLORIDA SPECIAL"

Southbound					Northbound	
5:30	p.m.	Lv.	Kansas City	Ar.	10:20	a.m.
11:30	p.m.	Lv.	Springfield	Ar.	4:20	a.m.
8:05	a.m.	Lv.	Memphis	Ar.	7:45	p.m.
3:40	p.m.	Lv.	Birmingham	Lv.	12:30	p.m.
9:30	p.m.	Ar.	Atlanta	Lv.	6:15	a.m.
9:45	p.m.	Lv.	Atlanta	Ar.	5:45	a.m.
1:15	a.m.	Lv	Macon	Ar.	3:50	a.m.
6:05	a.m.	Lv.	Jesup	Lv.	11:05	p.m.
8:45	a.m.	Ar.	Jacksonville	Lv.	8:25	p.m.

Through Sleeping Cars Between
Kansas City-Jacksonville
Springfield-Jacksonville
Atlanta-Jacksonville
Dining Car and Coaches

Put Your Painting Problem Up to Us

No matter what your painting requirements,—we can meet them to your entire satisfaction. There is no reason why you should ponder over painting questions, while our service and laboratories are at your disposal. We know you want permanence in mill white—durability and economy in mill village paints.

"ZEMCO-LITE" is the permanent mill white, with its aggregate of pure WHITE Portland Cement as its base. Will not discolor, chip, peel, or crack. It is the ideal paint for the walls and ceilings of your mill. "ZEMCO-LITE" is much more durable and economical than the highest grade oil paint made. Submit your requirements to us. That's our business—solving your painting problems. Write us today.

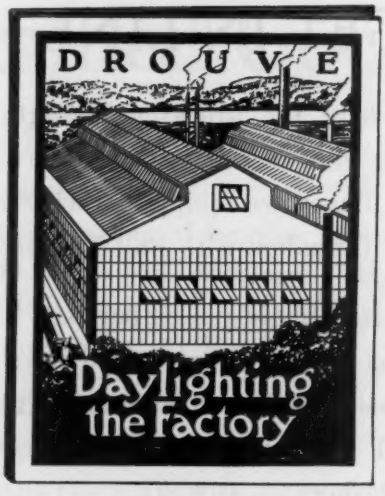
American Cement Paint Co., Chattanooga, Tenn.

Zemco-lite

TRADE MARK

"THE CEMENT PAINT"

"CEMENT FOR PERMANENCE:—WHY NOT ZEMCOLITE"



Look Into It!

Perfect lighting of the mill interior is today, more than ever, an economic necessity, and of all lighting, natural daylight is the best and cheapest.

If you are contemplating changes in your mill, new additions or a new mill construction, look into the matter of skylights. This interesting booklet tells how skylight roofs can be made as substantial as any other roofs, how glass breakage has been eliminated and corrosion prevented, how better lighting and more perfect ventilation is assured, illustrating many installations, and containing other data of value to the mill man.

A copy should be in every mill man's file. Write for your free copy today.

THE G. DROUVE CO.

BRIDGEPORT, CONNECTICUT

Why Hockaday was Selected

FROM A FIELD OF ELEVEN

THE AMERICAN TOOL WORKS COMPANY.

BUILDERS OF

LATHES - PLANERS - SHAPERS - RADIAL DRILLS.

CINCINNATI, U.S.A.

January 23, 1919.

Mr. G. A. Bess,
c/o The Hockaday Company,
Chicago, Ill.

Dear Sir:

I have received your many requests for a testimonial letter on "Hockaday Interio" paint applied to our plant in 1917, but have filed your requests until such time as the paint had time to speak for itself.

We had a green concrete building containing 250,000 square feet of floor space to paint in a hurry. Stock samples of eleven well-known brands of paints were secured. We prepared an equal quantity of each paint according to the directions on the package, and then an unobstructed stretch of ceiling was selected. The samples were started at a given point and a strip four feet wide applied until sample was used up, and the results were as follows:

	FIRST COAT - 1/2 GAL.			SECOND COAT - 1/4 GAL.			
SAMPLE NO.	SQUARE FEET.	HOW WORKED.	TIME (MIN.)	SAMPLE NO.	SQUARE FEET.	HOW WORKED.	TIME (MIN.)
1	180	Fairly good.	52	1.	76	Fairly good.	25
2	152	Tough.	58	2	72	Tough.	30
Hockaday	214	Very good.	48	Hockaday	108	Very good.	20
4	176	Fairly good.	45	4	64	Fairly good.	24
5	168	Very tough.	60	5	60	Very tough.	38
6	164	Fairly good.	52	6	68	Fairly good.	26
7	168	Tough.	58	7	68	Tough.	31
8	164	Tough.	58	8	64	Tough.	33
9	166	Tough.	60	9	68	Tough.	31
10	168	Fairly good.	53	10	64	Fairly good.	28
11	165	Tough.	58	11	70	Tough.	30

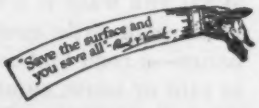
We figured that we could save about 30% in labor and about 30% of material by using Hockaday, and these outweighed any differences in cost, besides they were in a position to supply the necessary material.

This paint gave the concrete (which had been cast in metal forms) the appearance of enamel on smooth plaster. It has been two years since it was applied. In that time all has been scrubbed at least once, and some parts a dozen times, and the paint is still there. - Anybody who wants to see for himself, is welcome to do so.

Yours very truly,

THE AMERICAN TOOL WORKS CO.

RMT/K



The Hockaday Company

1823-1829 Carroll Avenue,

Chicago, Ill.

HOCKADAY

THE WASHABLE FINISH FOR ALL INTERIORS

YOUNGSTOWN

Youngstown Pipe

Is standard all over the world, accepted everywhere by architects and engineers as equal to the best tubular material produced. Its reputation has been won in actual service and its most steadfast friends are those who have used it longest. Its production at the rate of more than half a million tons per year tells the story.

Youngstown Sheet & Tube Company
Youngstown, Ohio

District Sales Offices:

BOSTON—120 Franklin St.
NEW YORK—30 Church St.
PHILADELPIA—Pennsylvania Bldg.
ATLANTA—Healey Bldg.
PITTSBURGH—Oliver Bldg.
CLEVELAND—Leader-News Bldg.
DETROIT—Dime Savings Bank Bldg.
CHICAGO—McCormick Bldg.
ST. LOUIS—1139 Olive St.
DENVER—First Nat'l Bank Bldg.
DALLAS—1401-2 Magnolia Bldg.
SAN FRANCISCO—604 Mission Bldg.
SEATTLE—Central Bldg.

CONCRETE — DIXIE PORTLAND CEMENT CO. ROYAL CHATTANOOGA, TENN. — PERMANENT

MR. TAXPAYER—YOU!

Do you want your country to spend YOUR good money on roads that will wear out before your bonded indebtedness is liquidated?

I SAY YOU DON'T.

What you want is a hard-surfaced road, with little cost for maintenance—a road that can be traveled in rain or snow, summer and winter. You want a PERMANENT road—that means CONCRETE!

Write for Literature—It's Free

DIXIE PORTLAND CEMENT CO.

CHATTANOOGA, TENN.

GET IN LINE—

Where the breaking strength of the yarn is a matter of importance Mill men are equipping their Slasher Cylinders with Ball Bearings.

Let us quote you on our Ball Bearing Truck Rollers. We have the easiest and most satisfactory method of applying ball bearings to Slashers.

A set will convince you.

AldricH MachinE Ball WorkS Bearings

Greenwood, S. C.

BALL BEARINGS Chapman

YOU PAY FOR THEM WHETHER YOU BUY THEM OR NOT

Who Pays?

Who pays for the power that friction steals—right in your own plant?

You do! But that is because you have not become familiar with the famous CHAPMAN BALL BEARINGS.

Day after day, year in and year out, you keep on paying for power that you do not get—power that FRICTION consumes.

CHAPMAN-IZE NOW AND SAVE MONEY

Here is an investment that will save you money as long as you are a producer through the use of power—an investment that pays for itself in a couple of years. "CHAPMAN BALL BEARINGS ON ALL YOUR LINE-SHAFTING ELIMINATES FRICTION."

Fool-proof, trouble-proof, care-free are these enemies of friction—and they'll save you as much as 15% to 40% in power costs.

The saving is too great to ignore! You pay for CHAPMAN'S whether you buy them or not! Why not have them?
THEY FIT YOUR PRESENT HANGER FRAMES

Drop us a line, and we'll be glad to tell you more.

TRANSMISSION BALL BEARING COMPANY

1061 MILITARY ROAD **BUFFALO, N. Y.**

Branches: New York, Chicago, Philadelphia, Cambridge, Mass.; Toronto, Canada. Representatives in Principal Cities.

A few of thousands of plants NOW USING CHAPMANS As Standard Equipment

GILLETTE SAFETY RAZOR CO.
Boston, Mass.
INTERNATIONAL MOTOR CO.
Plainfield, N. J
PIERCE-ARROW MOTOR CAR CO.
Buffalo, N. Y.
OSTERLEIN MACHINE CO.
Cincinnati, Ohio
GOULD & EBERHARDT
Newark, N. J.
BETHLEHEM STEEL CO.
South Bethlehem, Pa.
FORD MOTOR CO.
Walkerville, Ont.
FISHER BODY CO.
Detroit, Mich.
WATERBURY MAN'F'G CO.
Waterbury, Conn.
ROCK ISLAND ARSENAL
Rock Island, Ill.
BAUSCH & LOMB OPTICAL CO.
Rochester, N. Y.
CHICAGO PNEUMATIC TOOL CO.
Franklin, Pa.
CRUCIBLE STEEL CO.
Jersey City and Pittsburgh
HOOVER STEEL BALL CO.
Ann Harbor, Mich.
AMERICAN EVER READY CO.
Long Island City, N. Y.
NATIONAL TOOL CO.
Cleveland, Ohio
SUPERIOR GAS ENGINE CO.
Springfield, Ohio
VICTORIA COTTON MILLS
Rock Hill, S. C.

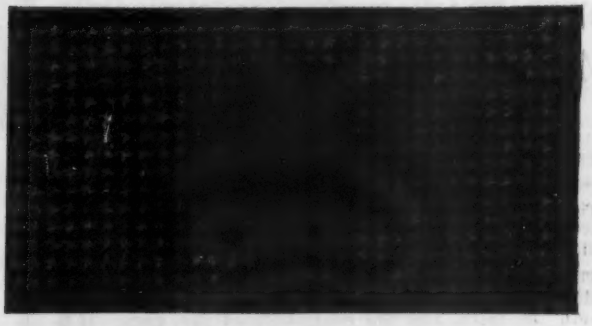
Stained Goods!

Hot Bearings mean short life.

Bearings are expensive.

Oil running out of bearings means dirty floors and machinery. RESULTS! WASTED MATERIAL FROM STAINED GOODS.

STAYSWELL laughs at drips and spatters.



STAINED GOODS ARE EASY TO AVOID BY USING THE SNOW-WHITE STAINLESS GRADES OF STAYSWELL

STAYSWELL "STAYS PUT" on the hottest bearing, eliminating all friction.

Let us quote you on your requirements.

LAMSON OIL CO., Inc.
10 Dorrance St. Wharf
PROVIDENCE, R. I.

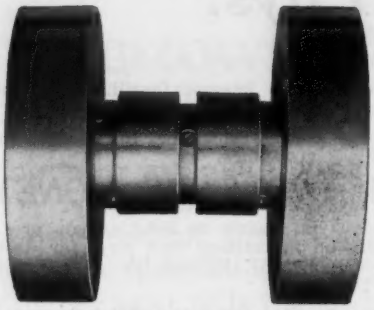
THE JOHNSON FRICTION CLUTCH

FOR REVERSING COUNTER SHAFT DRIVE

THE JOHNSON WAY IS THE EFFICIENT WAY

NOTE THAT ALL WORKING PARTS ARE ENCLOSED.

THIS IS ONE OF MANY REASONS WHY JOHNSON CLUTCHES ARE BEST FOR OVERHEAD SHAFTING.



DOUBLE CLUTCH WITH PULLEYS MOUNTED ON HUBS.

WRITE FOR CATALOG G

ANOTHER FEATURE—JOHNSON CLUTCHES MAY BE RUN AT HIGH SPEED WITHOUT VIBRATION. SLOW SPEED CLUTCHES CARRIED IN STOCK IN SIZES FROM ¾" SHAFT TO 3 3/16" BY 1/16". HIGH SPEED CLUTCHES ARE MADE SPECIAL TO MEET EACH REQUIREMENT.

See our Exhibit at the National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York, December 7th to 13th

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

CRESSON-MORRIS CO.

POWER TRANSMITTING MACHINERY

Merit Plus Recognition

"The heights by great men reached and kept were not attained by sudden flight."

Time, skill and effort must also precede merit as surely in machinery as in men.

Time, skill and effort must also precede merit in order to obtain and maintain for merit the recognition it deserves.

The great number of large installations of Cresson-Morris Power Transmitting Machinery is proof of both the merit and the recognition of the merit that nearly three score years of skill and effort have endowed it with.

The cumulative knowledge of all this experience is always available to you in the recommendations of our engineers.

CRESSON-MORRIS COMPANY

ENGINEERS—FOUNDERS—MACHINISTS

PHILADELPHIA, PENNA

Branch Office. 141 Milk St., Boston, Mass.

? ?

Have You Difficult Places to Oil??

Do You Want Just a Drop of Oil or More?

WELL

We can take care of your wants with the

LIDSEEN

POSITIVE FORCE FEED OILERS

Take it up with Your Jobber or with us

37 numbers of oilers to choose from ALL WELDED

LIDSEEN PRODUCTS

832-840 SO. CENTRAL AV. CHICAGO

CYCLONE HOISTS
HIGH SPEED

—multiply man-power!

ONE man at the easy pulling hand chain of a Cyclone Hoist will pile more stock, load and unload more material and feed more machines than a gang of men using muscle-power alone,—and do it quicker and cheaper.

A Cyclone Hand Hoist traveling on a system of C-M Matchless Trolleys will release scores of men from the time-consuming, hand-lifting jobs to more productive labor. It multiplies man power without multiplying the number of men on your pay-roll.

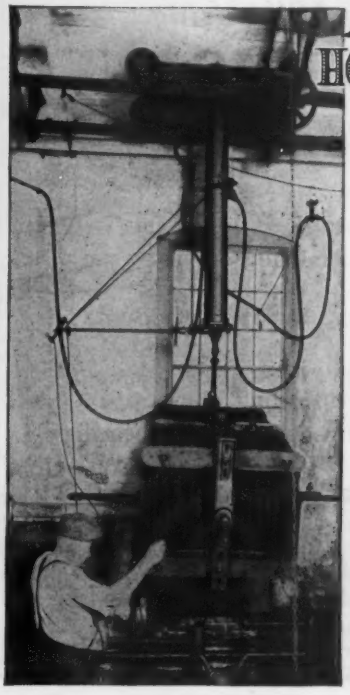
Our catalog explains all the mechanical superiorities of the Cyclone Hoist, the Hoist "with the Gyrating Yoke". Capable distributors in all localities can aid you in laying out material-handling and hoisting systems and submit estimates. Write.

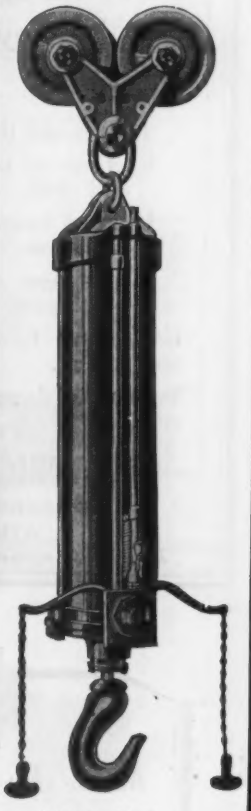
The Chisholm-Moore Mfg. Co.
Cleveland, O.

Hoists Cranes Trolleys

Branches: **New York, Chicago, Pittsburgh**

CURTIS
AIR HOISTS





Used in The Textile Industry

"Lift it with air

Curtis one man All Steel Air Hoists and Curtis Roller Bearing Trolleys are effecting important economies in leading textile mills throughout the country.

Why not install a Curtis Air Hoist and operate it with the air you now have available? The wide variety of uses to which Curtis equipment can be most economically applied is worthy of your immediate investigation.

Curtis Pneumatic Machinery Co.
1571 Kienlin Ave. St. Louis, Mo.
Branch Office
532-R Hudson Terminal New York

CURTIS
AIR COMPRESSORS-HOISTS-TROLLEYS-CRANES
ST. LOUIS
C.P.M.Co.

Established 1854

D-A Lubricant

Textile Mills Using

D-A LUBRICANT

Say It Is Best

Because—

It does not thin down under heat.

It clings to metal, thus saving yarn and cloth.

It lasts longer, making lubrication costs less.

It increases production by keeping machinery operating efficiently.

Use it on: Chain drives, cams, bearings and rollers.

Packed in drums, half drums and 50-lb. cans.

D-A LUBRICANT COMPANY, Inc.

Indianapolis, Indiana

ATLANTA BRANCH

John K. Gewinner, 33 Luckie St., Atlanta, Ga.

General Electric

Distributing Jobbers

Complete lines of Wire, Switches, Safety Switches, Wiring Devices, Fuses, Edison Mazda Lamps and other electrical materials carried in our Atlanta and Savannah warehouses ready for immediate shipment.

Quick Service

Carter Electric Co.

(WHOLESALE)

21 Haynes St. Atlanta, Ga.

TRADE JENKINS MARK Jenkins Bros

Made by the originators—

and backed by over 58 years' valve manufacturing experience — *genuine Jenkins Renewable Disc Valves.*

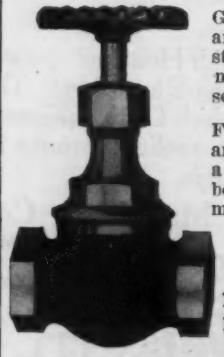


Fig. 106, Jenkins Standard Brass Globe Valve

Globe, Angle, Cross, Check, and Y Valves—each with strength and proportion to meet the most severe of service conditions.

For perfect valve performance use a Jenkins Disc in a Jenkins Valve. Know both by the Jenkins Diamond which they bear.

JENKINS BROS.

New York Boston

Philadelphia Chicago

Montreal London

FACTORIES: Bridgeport, Conn.; Elizabeth, N. J.; Montreal, Can.

2548-J

Jenkins Valves

SINCE 1864

Think of the Saving In WELDING Broken Parts

There is no need to send valuable machinery or parts to the scrap heap when broken, while STANDARD WELDING SERVICE is at your command. Not only does welding make worn or broken parts as good as new, but it makes them better and stronger.

Great economies are being effected in mills all over the country through welding with STANDARD OXYGEN AND SUPPLIES.

A further saving in welding operation can be effected by the use of PURE oxygen. Standard Oxygen is 99.5% pure—the best that money can buy.

Let us consult with you on your welding problems. A postal will bring full details.

STANDARD GAS PRODUCTS CO., INC.

ATLANTA, GA.

STANDARD

WELDING APPARATUS AND SUPPLIES

PROPER LIGHTING

is an economical necessity in present-day textile mills. It not only increases general all-'round efficiency and cheerfulness of operatives, but decreases to a wonderful extent wasteful "hold-ups" and stoppages, spoilage and "seconds" as well as prevents accidents to a great extent.

Scientific lighting means not more light but the proper lights in the proper places. Our illuminating experts have solved the lighting problems and saved many dollars on installation cost for a number of the leading Southern mills. Walker Service is always a guarantee of perfect and permanent satisfaction and economy.

Scores of satisfied mills and the leading architects and engineers are our references. Write us for the handsome Walker book.

Modern industrial lighting. Note the uniformity of illumination.

WALKER ELECTRIC & PLUMBING CO
ATLANTA, GEORGIA.

Branch Offices at Convenient Points Throughout the South

OPENERS

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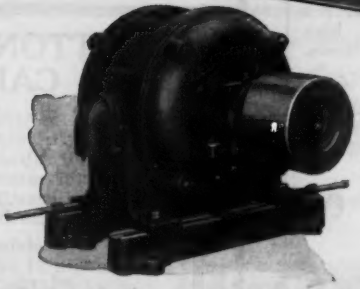
Type "AR" Textile Motors



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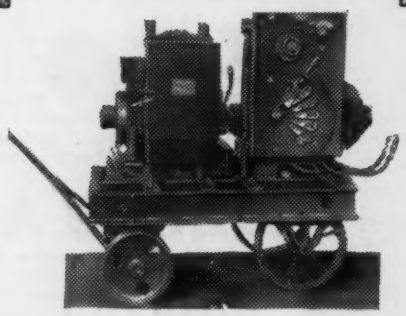

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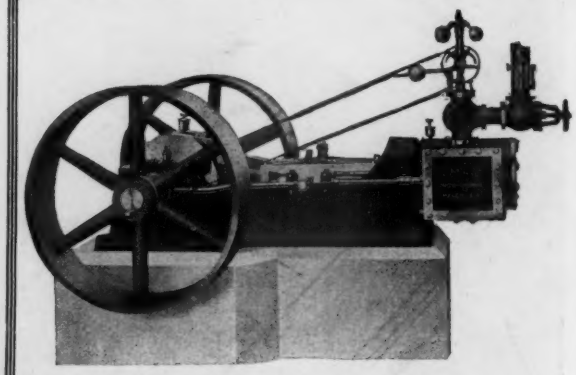

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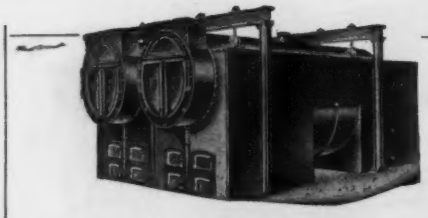

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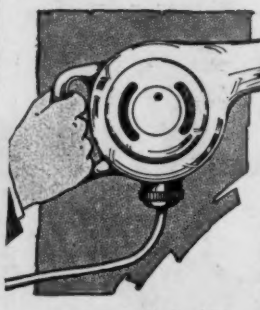

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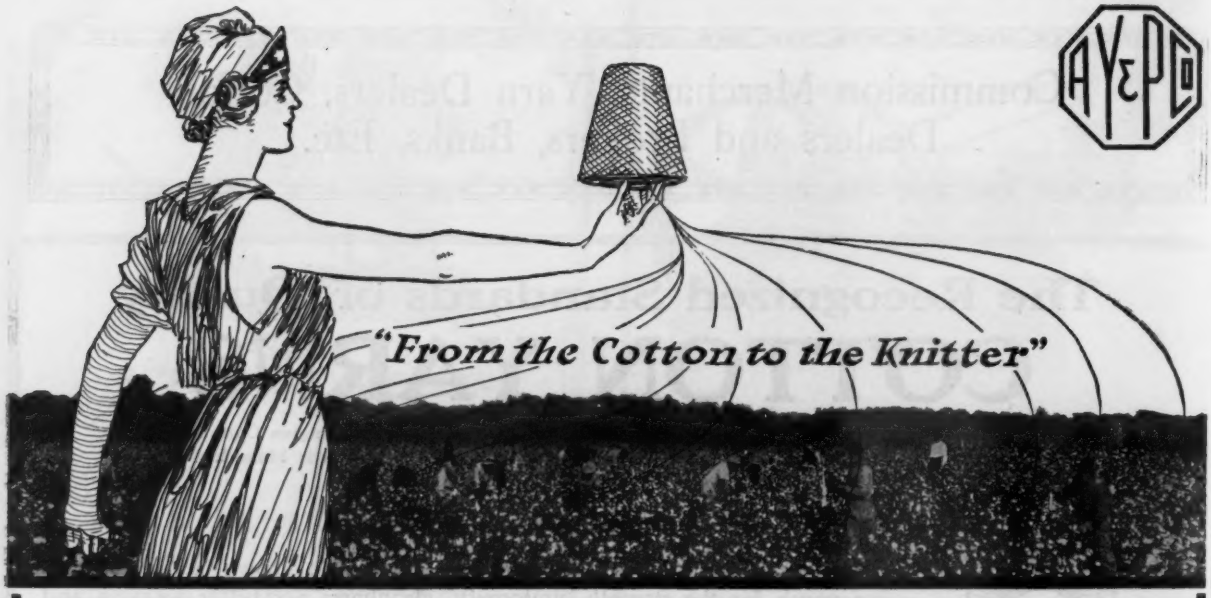

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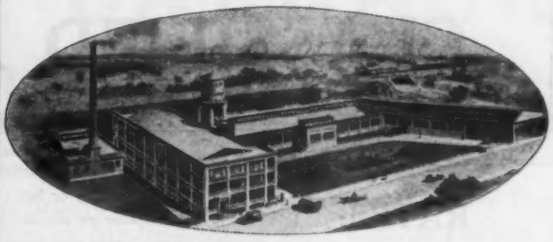

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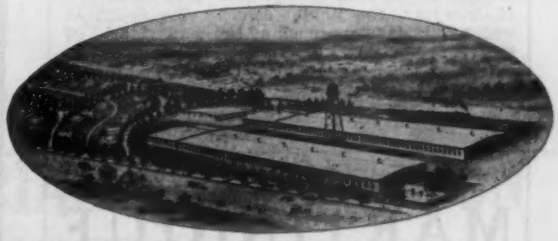

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BLEACHING, FINISHING AND SIZING MATERIALS.
(See Finishing Materials.)

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Carrier Eng. Corp.
Clements Mfg. Co.
General Electric Co.
Philadelphia Drying Mchry. Co.
Westinghouse Elec. & Mfg. Co.

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Keystone Fibre Co.

BOARDS—FORM.
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Parker Co., Walter S.
Shambow Shuttle Co.
Vermont Spool & Bobbin Co.
U. S. Bobbin & Shuttle Co.
Whitin Machine Works.

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Jordan Mfg. Co.
U. S. Bobbin & Shuttle Co.
Vermont Spool & Bobbin Co.

BOBBIN STRIPPERS.
Crompton & Knowles Loom Works.

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Lombard Iron Works & Supply Co.
Nashville Industrial Corp.
Schofield's Sons Co., J. S.
Toomey, Frank.
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Norwood Engineering Co.
Scaife & Sons, Wm. B.

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Dixon Crucible Co., Jos.
International Engineering Co.
Jenkins Bros.
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(See Grates and Stokers.)

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Monroe Calc. Mch. Co.

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Keystone Fibre Co.
Lewis Co., G. B.
Lyon Metallic Mfg. Co.
Standard Fibre Co.
Walke Box Co.

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BRAID.
(See Tapes.)

BRAZING.
(See Welding.)

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National Paving Brick Co.

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(See Cotton Dealers & Brokers.)

BROKERS—STOCK.
(See Stocks and Bonds.)

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(See Brushes.)

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Re-Fil-It Broom Mfg. Co.

BRUSHES—MILL.
Atlanta Brush Co.
Re-Fil-It Broom Mfg. Co.
Southwestern Broom Mfg. Co.

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General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Standard Fibre Co.

BUCKETS—ELEVATOR AND GRAB.
Link-Belt Company.

BUCKLES—COTTON TIE.
(See Box Strapping and Ties.)

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(See Contractors.)

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Truscon Steel Co.

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Anchor Post Iron Works.
Barrett Co., The
Birmingham Slag Co.
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Drouve Co., G.
Dufur & Co.
Hough Shade Corp.
Lupton's Sons Co., David.
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Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.
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Ware Paint Co.

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Brown Co., A. & F.
Dodge Sales & Eng. Co.
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Ernst & Ernst.

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Monroe Calculating Mch. Co.

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Textile Finishing Mchry. Co.

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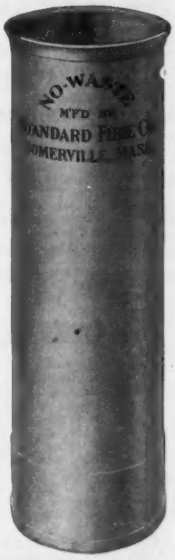

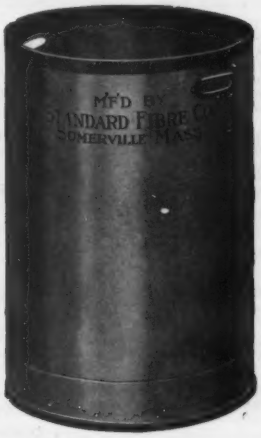

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Morse Chain Co.
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Renold, Hans.
Schofield, Wm., Co.

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(See Humidifying Apparatus.)

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(See Water Coolers.)

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Texas & Pacific Ry.
Nashville Industrial Corp.

FACTORY MANAGEMENT SYSTEMS.
Ernst & Ernst.

FANS—ELECTRIC.
Bayley Mfg. Co.
Buckeye Blower Co.
Carter Electric Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

FANS—CONVEYING, POWER AND EXHAUST.
(See Blowers and Blowing Systems.)

FASTENERS—BELT.
(See Belt Fasteners.)

FEED WATER PURIFIERS.
(See Boiler Feed Water Purification.)

FEEDERS.
(See Automatic Feeders.)

FELT CLOTH FOR ROLLS.
Philadelphia Felt Co.

FELTING MACHINERY.
Smith & Furbush Mch. Co.

FENCE—STEEL AND IRON.
Anchor Post Iron Works.

FENCE POSTS—CREOSOTED PINE.
Southern Wood Preserving Co.

FIBRE PRODUCTS.
Keystone Fibre Co.
Standard Fibre Co.

FILLING—CAP AND WARP.
U. S. Bobbin & Shuttle Co.

FILLING STATION PUMPS.
Bowser & Co., S. F.

FILTERS—WATER.
American Water Softener Co.
Norwood Engineering Co.
Scaife & Sons Co., Wm. B.

FILTERS—OIL REMOVAL.
Norwood Engineering Co.

FILTERS (ALUM).
Lennig & Co., Chas.

FINISHING.
(See Dyers, Bleachers and Finishers.)

FINISHING, BLEACHING AND SIZING MATERIALS.
Arnold, Hoffman & Co.
Barrett Co.
Borne, Scrymser Co.
Bosson & Lane.
Central Dyestuff & Chemical Co.
Ciba Co., Inc.
Corn Products Refining Co.
Du Pont de Nemours & Co., E. I.
Electro Bleaching Gas Co.
Electric Smelting & Aluminum Co.
Ferd Co., J. B.
India Alkali Works.
Kali Mfg. Co.
Keever Starch Co.
Lennig & Co., Chas.
Mates-Brown Co., Inc., B. P.
Mathieson Alkali Works, Inc.
Metz & Co., H. A.
National Aniline & Chemical Co.
Newport Chemical Works.
Roessler & Hassiacher Co.
Rohm & Haas Co.
Sandoz Chemical Co.
Sonneborn Sons, Inc., L.
Staley Mfg. Co., A. E.
United Chemical Products Corp.
Warren Soap Mfg. Co.
Wolf & Co., Jacques.

FIRE DOORS AND HARDWARE.
Lupton Sons Co., David.
Sanymetal Products Co.
Truscon Steel Co.

FIRE EXTINGUISHERS.
Grinnell Co.

FIRE HOSE.
(See Hose—Fire.)

FIRE PROTECTING PAINT.
(See Paint.)

FLAX SPINNING.
U. S. Bobbin & Shuttle Co.

FLEXIBLE COUPLINGS.
Allis-Chalmers Mfg. Co.
Cresson-Morris Co.

FLOOD LIGHTS—ELECTRIC.
Cooper Hewitt Electric Co.
General Electric Co.

FLOORING LUMBER.
Hightower Box & Tank Co.
Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.

FLOORING (TILE & BRICK).
National Paving Brick Co.

FLOORING—WOOD BLOCKS.
Southern Wood Preserving Co.

FLOOR SCRUBBING MACHINE
American Scrubbing Equipment Co.

FLOOR SCRUBBING POWDERS.
(See Scrubbing Powders.)

FLOOR SWEEPS.
(See Brushes.)

FLUTED ROLLS.
Brooks & Doxey, Ltd.
Howard & Bullough.
Lord Bros.
Saco-Lowell Shops.
Schofield & Sons, J. S.
Smith & Furbush Mach. Co.
Southern Spindle & Flyer Co.
Whitin Mach.ne Works.

FLYERS.
Howard & Bullough.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

FOUNDERS.
Briggs-Shaffner Co.
Brown Co., A. & F.
Cole Mfg. Co., R. D.
Cresson-Morris Co.
Lombard Fdy. & Mch. Wks.

FOUNTAINS—DRINKING.
Crane Co.
Manufacturing Equip. & Eng'g Co.
Miles Refrigerating Co.
Rundle-Spence Mfg. Co.
Taylor, Halsey W.

FRICTION CLUTCHES.
(See Clutches—Friction.)

FURNITURE—MILL.
Allen Co.
Lyon Metallic Mfg. Co.
Manufacturing Equip. & Eng'g Co.
Royal Metal Mfg. Co.
Sanymetal Products Co.

FUSES—ELECTRIC.
Carter Electric Co.
Federal Electric Co.

GARNETT MACHINES.
Roy & Son Co., B. S.
Smith & Furbush Mch. Co.

GAS ENGINES.
(See Engines—Gas.)

GAS HOLDERS.
Chicago Bridge & Iron Wks.

GASOLINE PUMPS AND STORAGE TANKS.
Bowser & Co., S. F.

GAUGE (YARN CLEANER).
Mates-Brown Co., Inc., B. P.

GAUGES—STEAM PRESSURE, ETC.
Foxboro Co., Inc.
Taylor Instrument Co.

GAUGE—OIL.
Brown Co., A. & F.
Lunkenheimer Co.

GAUGES—WATER.
Lunkenheimer Co.

GEARS—SILENT.
Brown Co., A. & F.
General Electric Co.
Link-Belt Company.
Morse Chain Co.
Renold, Hans.

GEAR CUTTING AND CUTTERS.
Brown Co., A. & F.
Cresson-Morris Co.

GEAR PULLERS.
General Electric Co.

GENERATORS—ELECTRIC.
(See Motors and Generators.)

GLASSWARE AND DISHES.
(See Dishes.)

GLASS SKYLIGHTS.
Drouve Co., G.

GOVERNORS—PUMP.
General Electric Co.

GRAPHIC CHARTS.
Ernst & Ernst.

GRAPHITE.
Dixon Crucible Co., Jos.

GRATES—BOILER.
Cole Mfg. Co., R. D.
International Eng. Works.
Lombard Fdry. & Mch. Co.
Walsh & Weidner Boiler Co.

GRATES—MECHANICAL.
(See Stokers.)

GREASE.
(See Lubricants.)

GREASE CUPS.
(See Lubricators.)

GRINDER—CARD, CYLINDER, ROLL, NAPPER AND GARNET.
(See Card Grinding Machinery.)

GUARDS—ELECTRIC LAMP.
(See Electric Lamp Guards.)

GUARDS — MACHINE, SKYLIGHT, WINDOW, ETC.
Anchor Post Iron Works.

GUIDES—THREAD.
Mitchell-Bissell Co.
Palmer Co., I. E

GUIDER—CLOTH-ELECTRIC.
Blake Electric Mfg. Co.

GUMS.
(See Finishing and Sizing Materials.)

HALFTONES—PRINTING.
Jacobs & Co.

HANGERS.
(See Shafting and Hangers.)

HANK CLOCKS.
(See Counters.)

HARDWARE—BUILDING.
Sanymetal Products Co.

HARNESS—LOOM.
American Supply Co.
Atlanta Harness & Reed Mfg. Co.
Crompton & Knowles Loom Works.
Emmons Loom Harness Co.
Greist Mfg. Co.
Garland Mfg. Co.
Hayes Loom Reed & Harness Co.

HEADS—BOBBIN AND SPOOL.
Allen Co.
Lestershire Spool & Bobbin Co.
Parker Co., Walter S.
U. S. Bobbin & Shuttle Co.

HEATERS.
Bayley Mfg. Co.

HEATING AND VENTILATING APPARATUS.
(See Ventilating Apparatus.)

HEATING & PLUMBING CONTRACTORS.
Walker Electric & Plbg. Co.

HEDDLES.
Crompton & Knowles Loom Works.
Draper Corporation.
Steel Heddle Mfg. Co.
Williams Co., J. H.

HEDDLE FRAMES.
Crompton & Knowles Loom Works.
Steel Heddle Mfg. Co.
Williams Co., J. H.

HOISTS.
Chisholm Moore Mfg. Co.
Curtis Pneumatic Mchry. Co.
Link-Belt Company.
Mason, Volney W.
Morse Chain Co.

HOPPER FEEDERS.
(See Automatic Feeders.)

HOSE—FIRE.
Collins, J. D.

HOSIERY DYEING MACHINERY.
Cole Mfg. Co., R. D.
Franklin Process Co.
Philadelphia Drying Mchry. Co.

HOSIERY FORMS.
(See Drying Forms.)

HOSIERY LABELS, BANDS, STICKERS, ETC.
Kirby-Cogeshall Co.

HOSIERY PACKING.
Kirby-Cogeshall Co.

HOSIERY YARNS.
(See Yarn Manufacturers.)

HOTELS.
Hotel Cecil.
Hotel Martinique.
Hotel Tuller.

HUMIDIFYING APPARATUS.
American Moistening Co.
Bayley Mfg. Co.
Carrier Eng. Corp.
Grinnell Co.
Mates-Brown Co., B. P.
Parks-Cramer Co.

HUMIDIFYING INDICATING INSTRUMENTS.
Mates-Brown Co., B. P.
Taylor Instrument Co.

HYDGRODEIKS.
Taylor Instrument Co.

HYGROMETERS.
Foxboro Co.
Mates-Brown Co., B. P.
Taylor Instrument Co.

HYDRAULIC TURBINES.
(See Turbines—Hydraulic.)

HYDRO EXTRACTORS.
(See Extractors.)

ICE MACHINES.
Miles Refrigerating Co.

ILLUMINATING ENGINEERS.
Curtis, Paul W.
Huntington & Guerry.
Ivanhoe-Regent Works.

INDICATING AND RECORDING INSTRUMENTS AND THERMOMETERS.
Durant Mfg. Co.
Foxboro Co., Inc.
General Electric Co.
Taylor Instrument Co.

INDIGO.
(See Dyestuffs and Chemicals.)

INDUSTRIAL SITES.
Alabama Power Co.
Georgia Ry. & Power Co.
Nashville Industrial Corp.
Tennessee Power Co.
Texas & Pacific Ry.

INJECTORS.
Lunkeheimer Co.

INK—STENCIL AND MARKING.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.

IRON WORK—ORNAMENTAL.
Anchor Post Iron Works.
Chicago Bridge & Iron Works.
Dufur & Co.
Lombard Iron Works & Supply Co.
Royal Metal Mfg. Co.

JACK SPOOLS.
(See Spools.)

JACQUARDS.
Crompton & Knowles Loom Works.

JOINT COMPOUND.
Dixon Crucible Co., Jos.

JUTE BAGGING MACHINE.
Smith & Furbush Machine Co.

KETTLES—SIZE.
(See Size Kettles.)

KETTLES—SODA.
Chicago Bridge & Iron Works.
Lombard Iron Works & Supply Co.

KIERS.
(See Bleaching Kiers.)

KNIT GOODS.
(See Cotton Cloth Commission Merchants and Dealers.)

KNIT GOODS WASHERS.
(See Washers—Cloth.)

KNITTING MACHINERY AND SUPPLIES.
Brinton Co., H.
General Machine Works.
Hemphill Mfg. Co.
Kirby-Cogeshall Co.
Scott & Williams.
Torrington Co.
Trump Bros. Machine Co.
Wildman Mfg. Co.

KNITTING NEEDLES.
Torrington Co.

LABELS FOR HOSIERY, BOXES, ETC.
Kirby-Cogeshall Co.

LABORATORY INSTRUMENTS.
Scott & Co., Henry L.
Foxboro Co., Inc.
Taylor Instrument Co.

LACING—BELT.
(See Belt Lacing.)

LAMPS—INCANDESCENT AND ARC.
Carter Electric Co.
Cooper Hewett Electric Co.
Curtis, Paul W.
Cutter Works, George.
General Electric Co.
Ivanhoe-Regent Works of G. E. Co.
Walker Electric & Plbg. Co.
Westinghouse Elec. & Mfg. Co.

LAMP GUARDS—KEY LOCKING.
(See Electric Lamp Guards.)

LAMP REFLECTORS.
Carter Electric Co.
Cooper Hewitt Electric Co.
Curtis, Paul W.
Cutter Works, George.
Ivanhoe-Regent Works of G. E. Co.
Walker Electric & Plbg. Co.
Westinghouse Elec. & Mfg. Co.

LANDSCAPE ARCHITECTS.
(See Village Architects.)

LAPPERS.
Brooks & Doxey, Ltd.
Lord Bros.
Saco-Lowell Shops.
Smith & Furbush Mch. Co.
Whitin Machine Works.

LAUNDRY MACHINERY.
American Laundry Mchry. Co.
Fletcher Works.
Hunt Machine Co., Rodney.
Schaum & Uhlinger.
Tolhurst Mach.ne Works.

LAVATORIES.
Crane Co.
Manufacturing Equip. & Eng'g Co.
Vogel Co., Jos. A.

LEATHER BELTING.
(See Belting.)

LEATHER SPECIALTIES.
American Supply Co.
Bond Co., Chas.
Jacobs Mfg. Co., E. H.
Williams & Sons, I. B.

LIGHTS—FLOOD.
Cutter Works, George.
Cooper Hewitt Electric Co.
General Electric Co.
Ivanhoe-Regent Works.
Westinghouse Elec. & Mfg. Co.

LIGHTING ENGINEERS AND CONTRACTORS.
(See Illuminating Engineers.)

LINEN YARNS.
(See Yarns Linen.)

LINK BELTING.
(See Belting—Link.)

LINTERS.
(See Waste Dealers.)

LIQUID CHLORINE.
(See Chlorine.)

LOADERS—WAGON AND TRUCK.
Link-Belt Company.

LOCKERS—METAL.
Collins, J. D.
Lupton Sons Co., David.
Lyon Metallic Mfg. Co.
Manufacturing Equip. & Eng'g Co.
Royal Metal Mfg. Co.
Sanymetal Products Co.

LOGWOOD EXTRACT.
(See Dyestuffs and Chemicals.)

LOOMS.
Compton & Knowles Loom Works.
Draper Corporation.
Fletcher Works.
Saco-Lowell Shops.
Schaum & Uhlinger.
Stafford Co.

LOOM ATTACHMENTS—AUTOMATIC.
Draper Corporation.

LOOM HARNESS.
(See Harness.)

LOOP PICKERS.
Jacobs Mfg. Co., E. H.

LUBRICANTS.
D-A Lubricant Co.
Dixon Crucible Co., Jos.
Lamson Oil Co., Inc.
Masury-Young Co.
N. Y. & N. J. Lubricant Co.
Texas Co.

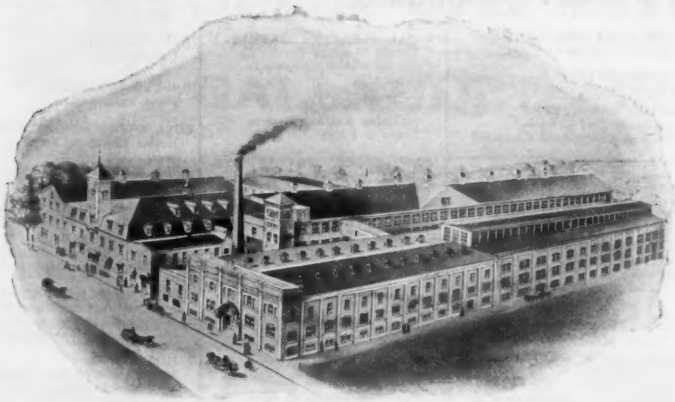
LUBRICATORS.
Bowser & Co., S. F.
Lidseen.
Lunkenheimer Co.
N. Y. & N. J. Lubricant Co.

LUG STRAPS.
(See Straps—Lug.)

LUMBER.
Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.

LUNCH ROOM EQUIPMENT.
(See Restaurant.)

MACHINE TOOLS.
(See Tools.)



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BUYERS' INDEX—Continued.

MACHINISTS.
Briggs-Shaffner Co.
Cole Mfg. Co., R. D.
Cresson-Morris Co.
Lombard Fdry. & Mch. Works.

MARKING POTS, STENCILS, INKS, ETC.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.

MERCERIZED YARNS.
(See Yarn Manufacturers).

MERCERIZERS.
Aberfoyle Mfg. Co.
Amer. Yarn & Processing Co.
Boger & Crawford.
Dixie Mercerizing Co.

MERCERIZED YARN.
Aberfoyle Mfg. Co.
American Yarn & Pro. Co.
Boger & Crawford Co.
Dixie Mercerizing Co.

MERCERIZING MACHINERY.
Butterworth, H. W. & Sons Co.
Textile Finishing Machinery Co.

METAL CEILINGS, ETC.
Lupton's Sons Co., David.
Truscon Steel Co.

METALS—PERFORATED.
(See Screens and Sieves.)

METERS—FLOW, AIR, GAS, ELECTRIC, STEAM, ETC.
Allis-Chalmers Mfg. Co.
Carter Electric Co.
Foxboro Co., Inc.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

METERS—COUNTING.
(See Counters.)

MILL BASKETS AND BOXES.
(See Boxes—Mill.)

MILL ENGINEER.
(See Architects and Engineers.)

MILL VILLAGES.
(See Villages.)

MILL SUPPLIES—MISCELLANEOUS.
(See Supplies—Mill.)

MILL WHITE PAINT.
(See Paint.)

MOPS.
Atlanta Brush Co.
Southwestern Broom Mfg. Co.

MOTION PICTURES.
(See Films.)

MOTORS AND GENERATORS—ELECTRIC.
Allis-Chalmers Mfg. Co.
Carter Electric Co.
Curtis, Paul W.
General Electric Co.
Nashville Industrial Corp.
Walker Electric & Plbg. Co.
Westinghouse Elec. & Mfg. Co.

MOVING PICTURE MCH. AND SUPPLIES.
(See Theatre Equipment.)

NAPPERS.
Roy & Son Co., B. S.

NEEDLES—KNITTING.
Torrington Co.

OFFICE EQUIPMENT & SUPPLIES.
Carter Electric Co.
Jacobs & Co.
Lupton's Sons Co., David
Monroe Calculating Mch. Co.
Royal Metal Mfg. Co.
Smith & Bros. Typewriter Co.
Sanymetal Products Co.

OFFICE PARTITIONS.
Lupton's Sons Co., David
Lyon Metallic Mfg. Co.
Sanymetal Products Co.

OIL—LUBRICATING.
D-A Lubricant Co.
Johnson & Co., Inc., Oliver.
Lamson Oil Co., Inc.
Masury-Young Co.
Texas Co.
Wadsworth, Howland & Co., Inc.

OIL ENGINES.
(See Engines Oil.)

OILS—FINISHING.
(See Finishing and Sizing Materials.)

OIL CANS.
Lidseen.

OIL CUPS.
(See Lubricators.)

OIL PAPER.
Bradley Mfg. Co., A. J.

OIL SEPARATORS.
(See Separators.)

OIL STORAGE TANKS AND PUMPS.
Bowser & Co., S. F.

OILING DEVICES.
(See Lubricators.)

OPENING MACHINERY—COTTON, WOOL, WASTE, ETC.
Brooks & Doxey, Ltd.
Lord Bros.
Murray Company, The.
Saco-Lowell Shops.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Whitin Machine Works.

OVERHEAD CARRIERS.
Chisholm-Moore Mfg. Co.
Curtis Pneumatic Mchry. Co.

OXIDIZING MACHINERY.
Phila. Drying Machinery Co.

OXYGEN.
Bird-Potts Co., Inc.
Commercial Acetylene Supply Co.
Oxweld Acetylene Co.
Standard Gas Products Co.

PACKING BOXES AND CASES—WOODEN.
Hauser-Stander Tank Co.
Hightower Box & Tank Co.
Lewis Co., G. B.
Waldo Box Co., Inc.

PACKINGS.
Jenkins Bros.

PAINT.
American Cement Paint Co.
Barrett Co., The.
Dixon Crucible Co., Jos.
Du Pont de Nemours & Co., E. I.
Hockaday Co.
Johnson & Co., Oliver.
Wadsworth, Howland & Co., Inc.
Ware Paint Co.

PAINTING CONTRACTORS.
(See Contractors.)

PANEL BOARDS.
(See Switchboards.)

PAPER.
Bradley Mfg. Co., A. J.

PARTITIONS—STEEL AND WIRE.
Anchor Post Iron Works.
Lupton's Sons Co., David.
Lyon Metallic Mfg. Co.
Sanymetal Products Co.

PERBORATE OF SODA.
Roessler & Hasslacher Chemical Co.

PERFORATED METAL.
(See Screens and Sieves.)

PEROXIDES.
Roessler & Hasslacher Chemical Co.

PICK COUNTERS.
(See Counters.)

PICKERS—CURLED HAIR.
Schofield Co., Wm.
Smith & Furbush Machine Co.

PICKERS—LEATHER.
Bond Co., Chas.
Garland Mfg. Co.
Jacobs Mfg. Co., E. H.

PICKER LOOPS.
Jacobs Mfg. Co., E. H.

PICKER STICKS.
Garland Mfg. Co.

PICKING MACHINERY.
Brooks & Doxey, Ltd.
Howard & Bullough Am. Machine Co.
Lord Bros.
Saco-Lowell Shops.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Whitin Machine Works.

PINIONS.
General Electric Co.

PIPE—STEEL RIVETED.
Chicago Bridge & Iron Wks.
Youngstown Sheet & Tube Co.

PIPE AND PIPE FITTINGS.
Chicago Bridge & Iron Wks.
Crane Co.
Grinnell Co.
Lunkenheimer Co.
Parks-Cramer Co.
Scaife & Sons Co., Wm. B.
Walker Electric & Plbg. Co.

PIPE DRAINAGE.
Dixie Culvert & Metal Co.
Youngstown Sheet & Tube Co.

PIPE JOINT COMPOUND.
Dixon Crucible Co., Jos.

PIPING—COTTON.
Youngstown Sheet & Tube Co.

PIPING ENGINEERS.
Grinnell Co.
Walker Electric & Plbg. Co.

PIPE BENDING.
Grinnell Co.
Youngstown Sheet & Tube Co.

PIPING (POWER, PROCESS.)
Grinnell Co.

PLAYGROUND APPARATUS & EQUIPMENT.
Crane Co.
Manufacturing Equip. & Eng'g. Co.
Royal Metal Mfg. Co.
Rundle-Spence Mfg. Co.
Taylor, Halsey W.

PLUMBING & HEATING CONTRACTORS.
Walker Electric & Plbg. Co.

PNEUMATIC MACHINERY & TOOLS.
Curtis Pneumatic Mchry. Co.

PORCELAIN GUIDES.
Mitchell-Bissell Co.

PORTABLE CONVEYORS.
(See Conveyors.)

POSTS—FENCE (WOOD.)
Southern Wood Preserving Co.

POWER—ELECTRIC.
Alabama Power Co.
Georgia Ry. & Power Co.
Tennessee Power Co.

POWER TRANSMISSION.
Aldrich Machine Works.
Allis-Chalmers Mfg. Co.
Bond Co., Chas.
Brown Co., A. & F.
Carlyle-Johnson Mch. Co.
Cresson-Morris Co.
Dixon Crucible Co., Jos.
Fafnir Bearing Co.
Flexible Steel Lacing Co.
General Electric Co.
Grinnell Co.
Hyatt Roller Bearing Co.
Link-Belt Company.
Morse Chain Co.
Renold, Inc., Hans.
Skayef Ball Bearing Co.
Transmission Ball Bearing Co.
U. S. Ball Bearing Co.
Westinghouse Elec. & Mfg. Co.
Williams & Sons, I. B.
Wood's Sons Co., T. B.

PRESERVATIVE PAINT FOR METAL WORK.
(See Paints.)

PRESSED STEEL.
Lupton's Sons Co., David.

PRESSES.
American Laundry Mchry. Co.
Butterworth & Sons Co., H. W.
Economy Baler Co.
Phila. Drying Mch. Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Rex Eng'g Corp.
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The.

PRESSURE REGULATORS.
(See Regulators—Pressure.)

PRINTING.
Jacobs & Co.
Showalter Printing Co., A. J.

PRINTING EXTRACTORS—HYDRO.
Tolhurst Machine Works.

PULLEYS.
Brown Co., A. & F.
Cole Mfg. Co., R. D.
Dodge Sales & Eng. Co.
Cresson-Morris Co.
Link-Belt Company.
Mason, Voiney W.
Renold, Inc., Hans.
Wood's Sons Co., T. B.

PULLEY COVERING.
Williams & Sons, I. B.

PUMPS.
Allis-Chalmers Mfg. Co.
Bowser & Co., S. F.
Goulds Mfg. Co.
Sydnor Pump & Well Co., Inc.
Toomey, Frank.
Walsh & Weidner Boiler Co., The.
Westinghouse Elec. & Mfg. Co.

PUMPS—OIL.
Bowser & Co., S. F.
Lunkenheimer Co.

PUMP VALVES.
(See Valve Discs.)

PYROMETERS.
Foxboro Co.
Taylor Instrument Co.

QUILLS.
Jordan Mfg. Co.
U. S. Bobbin & Shuttle Co.

QUILL CLEANING MACHINES.
Terrell Machine Co.

RAILWAYS.
A. & W. P. Ry.
Georgia Railroad.
Southern Railway System.
Texas & Pacific Ry.

RAW STOCK DRYING SYSTEMS.
Brandwood, John.

RECEPTACLES—FIBRE.
(See Fibre Products.)

RECORDING INSTRUMENTS.
Durant Mfg. Co.
Foxboro Co., Inc.
General Electric Co.
Mates-Brown Co., B. P.
Service Recorder Co.
Taylor Instrument Co.

REEDS.
American Supply Co.
Atlanta Harness & Reed Mfg. Co.
Emmons Loom Harness Co.
Hayes Loom Reed & Harness Co.

REELS.
Crompton & Knowes Loom Works.
Draper Corporation.
Gallaudet Aircraft Corporation.
Hunt Machine Co., Rodney.
Mossberg Pressed Steel Co.
Saco-Lowell Shops.
Schofield Co., Wm.
Whitin Machine Works.

REFLECTORS—LAMPS.
(See Lamp Reflectors.)

REGULATORS—LIQUID LEVEL.
Foxboro Co., Inc.
General Electric Co.

REGULATORS—PRESSURE.
Foxboro Co., Inc.
General Electric Co.
Taylor Instrument Co.

REGULATORS—TEMPERATURE.
(See Temperature Controllers.)

REINFORCING SLAG.
Birmingham Slag Co.

REPAIRING—ELECTRICAL
Briggs-Shaffner Co.
Curtis, Paul W.
Westinghouse Elec. & Mfg. Co.

REPAIRING—TEXTILE MACHINERY, ETC.
Bird-Potts Co., Inc.
Briggs-Shaffner Co.
General Machine Works.
Southern Spindle & Flyer Co.
Standard Gas Products Co.

RESTAURANT EQUIPMENT.
Sanymetal Products Co.

RIBBERS.
(See Knitting Machinery.)

RIB TOP CUTTERS.
General Machine Works.
Wildman Mfg. Co.

RING TRAVELERS—STEEL AND BRONZE.
Whitinsville Spinning Ring Co.
Whitin Machine Works.

RINGS—SPINNING.
(See Spinning Rings.)

ROCKER SHAFT BEARINGS.
(See Bearings.)

ROLLS—CALENDER.
Brooks & Doxey, Ltd.
Butterworth & Sons Co., H. W.
Lord Bros.
Roy & Son Co., B. S.
Textile Finishing Mchy. Co.
U. S. Bobbin & Shuttle Co.
Washburn & Sons, L. R.

ROLLS—RUBBER COVERED.
Butterworth & Sons Co., H. W.
Textile Finishing Mchy. Co.
Washburn & Sons, L. R.

ROLLS—STEEL.
Allen Co.
Brooks & Doxey, Ltd.
Butterworth & Sons Co., H. W.
Lord Bros.
Southern Spindle & Flyer Co.
Textile Finishing Mchy. Co.
U. S. Bobbin & Shuttle Co.
Washburn & Sons, L. R.

ROLLS (WOODEN).
U. S. Bobbin & Shuttle Co.
Washburn & Sons, L. R.

ROLLER CLOTH.
Philadelphia Felt Co.

ROLLER LEATHER.
Bond & Co., Chas.

ROLL TREATING CHEMICAL.
Korite Products, Inc.

ROLL WASTE PACKERS.
Belger Co.

ROOFING.
Barrett Co.
Cortright Metal Roofing Co.
Southern Wood Preserving Co.
Wardsworth, Howland & Co.

ROOF AND CEMENT COATING.
American Cement Paint Co.
Barrett & Co.
Du Pont de Nemours & Co., E. I.
Hockaday Co.
Johnson & Co., Inc., Oliver.
Wardsworth, Howland & Co.
Ware Paint Co.

ROPE—TRANSMISSION.
Allis-Chalmers Mfg. Co.
Brown & Co., A. & F.
Cresson-Morris Co.
Link-Belt Company.

ROPE SHEAVES.
Brown & Co., A. & F.

ROVING CANS.
(See Cans—Roving.)

ROVING MACHINERY.
Brooks & Doxey, Ltd.
Howard & Bullough.
Lord Bros.
Saco-Lowell Shops.
Whitin Machine Works.

RUBBER STAMPS.
(See Stamps, Stencils, Etc.)

SALAMANDERS.
Drouve Co., G.

SALTS.
(See Finishing & Sizing Materials.)

SANITARY PRODUCTS.
Crane Co.
Dixie Culvert & Metal Co.
Manufacturing Equip. & Eng'g Co.
Rundle-Spence Mfg. Co.
Sanymetal Products Co.
Taylor, Halsey W.
Vogel Co., Jos. A.
Walker Electric & Plbg. Co.

SASH-WINDOW—STEEL.
Drouve Co., G.
Lupton's Sons Co., David.
Sanymetal Products Co.
Truscon Steel Co.

SASH OPERATOR.
Drouve Co., G.

SCALE PREVENTER—BOILER.
(See Boiler Feed Water Purification.)

SCREENS—MOVING PICTURE.
Southern Theatre Equip. Co.

SCREENS AND SIEVES—PERFORATED.
Allis-Chalmers Mfg. Co.
Erdle Perforating Co.
Link-Belt Company.

SCOURING MACHINERY.
(See Washers—Cloth.)

SCRUBBING MACHINE—FLOOR.
American Scrubbing Equip. Co.

SCRUBBING AND WASHING POWDERS.
Mathieson Alkali Works.
India Alkali Works.
Waren Soap Mfg. Co.

SCUTCHERS.
Brooks & Doxey Co., Ltd.
Lord Bros.
Whitin Machine Works.

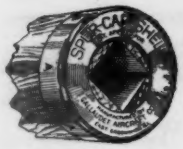
SECOND HAND MACHINERY AND SUPPLIES.
Nashville Industrial Corp.
Toomey, Frank, Inc.

SELVAGE HARNESS.
(See Harness.)

SEWING MACHINES.
Merrow Machine Co., The.
Textile Finishing Mchry. Co.

SHADES—ELECTRIC LAMP.
(See Reflectors.)

SHADES (WINDOW).
Hough Shade Corp.



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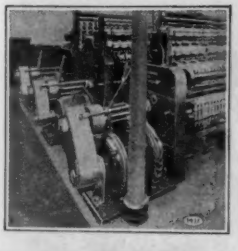

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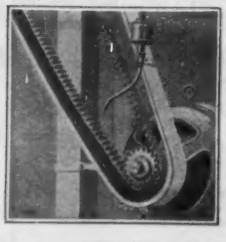

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Grinnell Co.
Link-Belt Company.
Skayef Ball Bearing Co.
Transmission Ball Bearing Co.
Wood's Sons Co., T. B.

SHEARS.
Roy & Sons Co., B. S.

SHELVING—SECTIONAL STEEL.
Collins, J. D.
Hyatt Roller Bearing Co.
Lupton's Sons Co., David
Lyon Metallic Mfg. Co.
Manufacturing Equip. & Eng'g Co.
Royal Metal Mfg. Co.
Sanymetal Products Co.

SHINGLES—ASPHALT.
Barrett Co.

SHINGLES—METAL.
Cortright Metal Roofing Co.

SHINGLES—WOOD.
Southern Cypress Mfg. Assn.
Southern Wood Preserving Co.

SHIPPING ROOM MACHINERY AND SUPPLIES.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.
Collins, J. D.
Hauser-Stander Tank Co.
Hightower Box & Tank Co.
Royal Metal Mfg. Co.
Lewis Co., G. B.
Lyon Metallic Mfg. Co.
Standard Fibre Co.
Walke Box Co., Inc.

SHOWER BATHS AND CABINETS.
Crane Co.
Lyon Metallic Mfg. Co.
Sanymetal Products Co.

SHUTTLES.
Crompton & Knowles Loom Draper Corporation.
Jordan Mfg. Co.
Shambow Shuttle Co.
U. S. Bobbin & Shuttle Co.
Williams Co., J. H.

SIGNS—ELECTRIC.
Federal Electric Co.

SINGEING MACHINERY.
Butterworth & Sons Co., H. W.
Phila. Drying Machine Co.
Textile Finishing Machinery Co., The.

SIREN.
Brown & Co., A. F.
Federal Electric Co.

SITES FOR FACTORIES.
(See Industrial Sites.)

SIZE BOX TEMPERATURE CONTROLLER.
Foxboro Co.

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Butterworth & Sons Co., H. W.
Hauser-Stander Tank Co.
Howard & Bullough American Machine Co.
Lombard Iron Wks. & Sup. Co.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The.
Woolford Wood Tank Co., G.

SIZING AND FINISHING COMPOUNDS.
(See Finishing and Sizing Materials.)

SKEWERS.
Jordan Mfg. Co.

SKYLIGHTS.
Drouve Co., G.
Lupton's Sons Co., H. W.

SLAG FOR CONCRETE.
Birmingham Slag Co.

SLASHERS AND SLASHER ROOM SUPPLIES.
Allen Co.
Butterworth & Sons Co., H. W.
Cole Mfg. Co., R. D.
Howard & Bullough
Mossberg Pressed Steel Corp.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The.

SLASHER CLOTH.
Philadelphia Felt Co.

SLASHER HOODS.
Cole Mfg. Co., R. D.

SLASHER TAPE.
(See Tape—Slasher.)

SLATE ASPHALT ROOFING.
Barrett Co.

SLIDING PARTITION HARDWARE.
Lupton's Sons Co., David.
Lyon Metallic Mfg. Co.
Manufacturing Equip. & Eng'g Co.
Sanymetal Products Co.

SLUBBERS.
Brooks & Doxey, Ltd.
Howard & Bullough.
Lord Bros.
Saco-Lowell Shops.
Whitin Machine Works.

SMOKE STACKS.
Chicago Bridge & Iron Wks.

SOAP—TEXTLE.
Arnold, Hoffman & Co.
Borne, Scrymser Co.
Ciba Co., Inc.
Du Pont de Nemours & Co., E. I.
Electric Smelting & Aluminum Co.
India Alkali Works.
Kali Mfg. Co.
Lennig & Co., Chas.
Mathieson Alkali Works, Inc.
Mates-Brown Co., Inc., B. P.
Newport Chemical Works.
Rohm & Hass Co.
Sonneborn Sons, Inc., L.
United Chemical Products Corp.
Warren Soap Mfg. Co.
Wolf & Co., Jacques.

SODA—TEXTILE, SODA ASH AND BOILING.
Lennig & Co., Chas.
Mathieson Alkali Works, Inc.
Sonneborn Sons, Inc., L.

SOFTENERS—COTTON.
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Borne, Scrymser Co.
Bosson & Lane.
Central Dyestuff & Chem. Co.
Ciba Co., Inc.
Du Pont de Nemours & Co., E. I.
Ford Co., J. B.
Grasselli Chemical Co.
Kali Mfg. Co.
Lennig & Co., Chas.
Mates-Brown Co., Inc., B. P.
Newport Chemical Works.
Roessler & Hasslacher Chemical Co.
Rohm & Hass Co.
Sonneborn Sons, Inc., L.
United Chemical Prod. Corp.
Wolf & Co., Jacques.

SOFTENERS—WATER.
(See Water Softeners.)

SOLDERLESS CONNECTORS—FRANKEL.
Westinghouse Elec. & Mfg. Co.

SOLOZONE.
Roessler & Hasslacher Chem. Co.

SOLVENTS.
(See Finishing.)

SPEEDERS.
Jordan Mfg. Co.
Parker & Co. Walter S.
U. S. Bobbin & Shuttle Co.
Vermont Spool & Bobbin Co.

SPEEDOMETERS.
(See Counters.)

SPINDLES.
Draper Corporation.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Vermont Spool & Bobbin Co.
Whitin Machine Works.

SPINNERS.
Aberfoyle Mfg. Co.
Amer. Yarn & Processing Co.
Arkray Mills, Inc.
Arlington Cotton Mills.
Arrow Mills, Inc.
Boxer & Crawford.
Callaway Mills, Inc.
Flint Mfg. Co.
Fletcher Works.
Florsheim, H. A.
Gray Mfg. Co.
Myrtle Mills, Inc.
Philadelphia Felt Co.
Parkdale Mills, Inc.
Southern Yarn Co.

SPINNING FRAMES.
American Machine Co., H. & B.
Crompton & Knowles Loom Works.
Brooks & Doxey, Ltd.
Davis & Furber Mch. Co.
Howard & Bullough.
Lord Bros.
Schaum & Uhlinger.
Saco-Lowell Shops.
Whitin Machine Works.

SPINNING GRADES.
Valley Waste Mills.

SPINNING RINGS.
Brooks & Doxey, Ltd.
Draper Corporation.
Howard & Bullough.
Grelst Mfg. Co.
Lord Bros.
Whitin Machine Works.
Whitinsville Spinning Ring Co.

SPINNING TAPE SPECIALISTS.
American Textile Banding Co., Inc.
Barber Mfg. Co.

SPOOLING MACHINERY AND SUPPLIES.
Draper Corporation.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.,
Whitin Machine Works.

SPOOLER TENSIONING DEVICE.
Textile Specialty Co.

SPOOLS AND SKEWERS.
Jordan Mfg. Co.
Lestershire Spool & Mfg. Co.
Mossberg Pressed Steel Corp.
Parker Co., Walter S.
U. S. Bobbin & Shuttle Co.
Vermont Spool & Bobbin Co.

SPRINKLER SYSTEMS.
Grinnell Co.

SPRINKLER TANKS.
(See Tanks, Towers, Etc.)

SPROCKETS.
Link-Belt Company.
Morse Chain Co.
Renold, Inc., Hans.

SPUR CAP SHELLS.
Gallaudet Aircraft Corporation

STAMPS, STENCILES AND STENCIL MACHINES.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.

STAND PIPES.
(See Tanks.)

STARCH AND GUMS.
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Borne, Scrymser Co.
Bosson & Lane.
Ciba Co.
Corn Products Refining Co.
Kali Mfg. Co.
Keever Starch Co.
Mathieson Alkali Works, Inc.
Metz Co., H. A.
Staley Co., A. E.
Warren Soap Co.

STEAM ENGINES.
(See Engines—Steam.)

STEAM HOSE.
(See Hose—Fire.)

STEAM PUMPS.
(See Pumps—Steam.)

STEAM SEPARATORS.
(See Separators.)

STEAM TRAPS.
(See Traps—Steam.)

STEEL PLATE CONSTRUCTION.
Chicago Bridge & Iron Wks.

STEEL RIVETED PIPE.
Chicago Bridge & Iron Wks.

STEEL SHELVING, DOORS, WINDOW PARTITIONS, ETC.
Collins, J. D.
Lupton & Sons Co., David.
Lyon Metallic Mfg. Co.
Manufacturing Equip. & Eng'g Co.
Royal Metal Mfg. Co.
Sanymetal Products Co.
Truscon Steel Co.

STENCILS AND STENCIL PAPERS.
(See Stamps and Stencils.)

STENCIL BRUSHES.
(See Marking Pots and Brushes.)

STENCIL CUTTING MACHINES.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.

STICKS—PICKER.
(See Picker Sticks.)

STICKERS AND LABELS FOR HOSIERY, BOXES, ETC.
Kirby-Cogeshall Co.

STOOLS.
(See Furniture—Mill.)

STOP WATCHES.
Service Recorder Co.
Silberberg, Mortimer J.

STOP MOTION.
Crompton & Knowles Loom Works.
Draper Corporation.
Eclipse Textile Devices, Inc.
Whitin Machine Works.
Wildman Mfg. Co.

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Westinghouse Elec. & Mfg. Co.

STORAGE RACKS.
(See Shelving.)

STRAPS (LUG, CHECK, HEEL, TUGGER, PICKER HARNESS, ETC.)
Atlanta Harness & Reed Co.
Bond & Co., Chas.
Hayes Loom Harness & Reed Co.
Jacobs Mfg. Co., E. H.
Garland Mfg. Co.

STRAPPING.
(See Leather Specialties or Check Straps.)

STREET LIGHTING FIXTURES.
Cutter Works, George.

SULPHIDES.
(See Finishing & Sizing Materials.)

SULPHUROUS ACID GENERATOR.
Macomb Machine Co.

SUPPLIES—GENERAL MILL.
Brown, A. & F.
Dodge Sales & Eng. Co.
Jenkins Bros.
Lunkenheimer Co.
Nashville Industrial Corp.

SWITCHES—KNIFE-ELECTRIC.
Cutter Works, George.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

SWITCHBOARDS—PANEL.
Cutter Works, George.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

SYSTEMS (BUSINESS.)
Ernst & Ernst.

TABLES—MILL.
Lupton's Sons Co., David.
Lyon Metallic Mfg. Co.
Manufacturing Equip. & Eng'g Co.
Royal Metal Mfg. Co.
Sanymetal Products Co.

TALLOW.
(See Finishing Machinery.)

TANKS—OIL, GASOLINE, PAINT, ETC.
Bowser & Co., S. F.

TANKS (ELEVATED.)
Chicago Bridge & Iron Wks.
Cole Mfg. Co., R. D.
Lombard Iron Works.
Walsh & Weidner Boiler Co.
Woolford Wood Tank Co., G.

TANKS (SPRINKLER.)
Chicago Bridge & Iron Wks.
Cole Mfg. Co., R D.
Grinnell Co.
Lombard Iron Works.
Woolford Wood Tank Co., G.

TANKS (STEEL STORAGE.)
Chicago Bridge & Iron Wks.
Cole Mfg. Co., R. D.
Grinnell Co.
Lombard Iron Works.
Walsh & Weidner Boiler Co.

TANKS (WOODEN.)
Chicago Bridge & Iron Wks.
Grinnell Co.
Hauser-Stander Tank Co.
Hightower Box & Tank Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz.
Textile Finishing Mchry. Co.
Woolford Wood Tank Co., G.

TAPE LOOMS—COTTON.
Fletcher Works.
Schaum & Uhlinger.

TAPES AND BRAIDS.
American Textile Banding Co., Inc.
Barber Mfg. Co.
Weimar Brothers.

TAPES—SPINNING AND TWISTING.
Barber Mfg. Co.

TAPE MAKING MACHINES.
(See Bandage and Tape Machinery.)

TAX SERVICE.
Ernst & Ernst.

TELEPHONE—CALLING SYSTEM.
Carter Electric Co.
General Electric Co.

TEMPERATURE REGULATORS
Carrier Eng. Corp.
Foxboro Co., Inc.
General Electric Co.
Mates-Brown Co., B. P.
Parks-Cramer Co.
Taylor Instrument Co.

TEMPLES.
Draper Corporation.

TENTERS.
Butterworth & Sons Co., The.
Textile Finishing Mach. Co.

TENTER FRAME GUIDER—ELECTRIC.
Blake Electric Mfg. Co.

TENTER HOUSING & RECONSTRUCTING SYSTEM.
Proctor & Schwartz, Inc.

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Scott & Co., Henry L.

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(See Cotton Mill Machinery.)

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Southern Theatre Equip. Co.

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Foxboro Co.
Mates-Brown Co., B. P.
Taylor Instrument Co.

THERMOMETERS—RECORDING AND INDEX.
Foxboro Co.
Mates-Brown Co., B. P.
Taylor Instrument Co.

THERMOSTATS.
Foxboro Co.

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Draper Corporation.

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Brooks & Doxey, Ltd.
Lord Bros.

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Mitchell-Bissell Co.
Palmer Co., The I. E.

TICKETS (RIDER).
Kirby-Cogeshall Co.

TILE & BRICK.
National Paving Brick Co.

TIMBER.
(See Lumber.)

TIME CLOCKS.
(See Clocks.)

TIERING MACHINES.
Collins, J. D.

TIES—BALING.
(See Bale Ties.)

TIRE FABRIC EQUIPMENT.
Fletcher Works.

TOE STICKERS (HOSIERY).
Kirby-Cogeshall Co.

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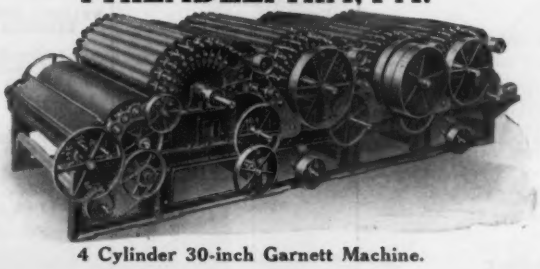

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Lupton's Sons Co., David.
Manufacturing Equip. & Eng'g Co.
Sanymetal Products Co.

TOOL CABINETS—STEEL.
Lupton's Sons Co., David.
Manufacturing Equip. & Eng'g Co.

TOOL STANDS—STEEL.
Lupton's Sons Co., David.
Royal Metal Mfg. Co.

TOWERS.
(See Tanks—Elevated.)

TRACTORS—ELECTRIC, INDUSTRIAL.
Collins, J. D.

TRANSMISSION—POWER.
(See Power Transmission Machinery.)

TRAPS—RETURN STEAM.
Morehead Mfg. Co.

TRIPTODS.
U. S. Bobbin & Shuttle Co.

TROLLEYS & HOISTS.
Chisholm-Moore Mfg. Co.
Curtis Pneumatic Machy. Co.

TRUCKS—AUTO.
White Co.

TRUCKS, BASKETC, ETC.
Keystone Fibre Co.
Lewis Co., G. B.
Lyon Metallic Mfg. Co.
Standard Fibre Co.

TRUCKS—ELECTRIC—INTER.
Collins, J. D.

TRUCKS—HAND AND ELEVATING.
Collins, J. D.

TRUCKS—INTER, ETC.
Keystone Fibre Co.
Lewis Co., G. B.
Lyon Metallic Mfg. Co.
Standard Fibre Co.

TUBS.
(See Tanks—Wooden.)

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VATS.
(See Tanks—Wooden.)

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(See Trucks.)

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(See Lavatories.)

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American Laundry Mchry. Co.
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WATER TOWERS.
(See Tanks—Elevated.)

WATERPROOFING MACHINERY.
Butterworth & Sons Co., H. W.
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WEAVING.
(See Yarn Manufacturers.)

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(See Drop Wires.)

WIRE HEDDLES.
(See Heddles.)

WIRING CONDUITS AND FITTINGS.
(See Electric Machinery and Supplies.)

WIRING—ELECTRICAL.
(See Electrical Contractors.)

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(See Lumber.)

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(See Pulleys.)

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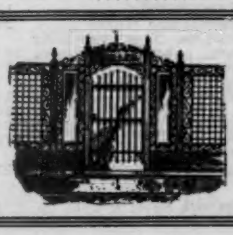

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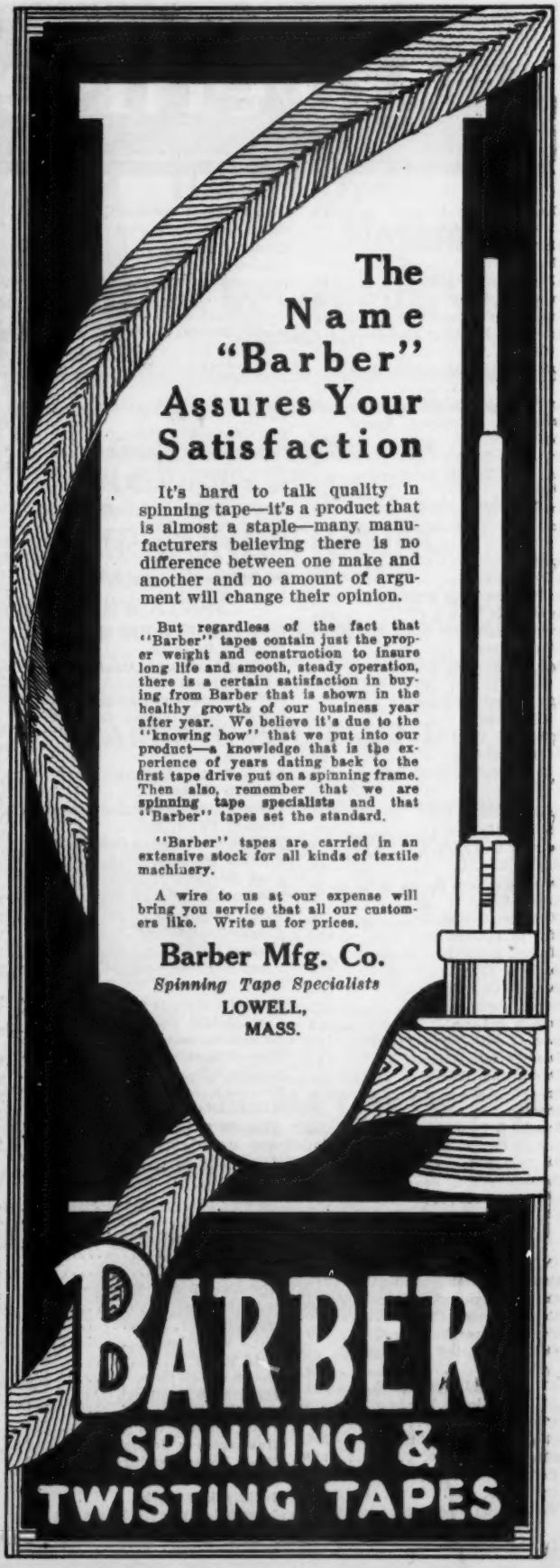

BARBER
SPINNING & TWISTING TAPES

Advertisers' Index

Aberfoyle Mfg. Co. 164
Alabama Power Co. 19
Aldrich Machine Works 272
Allen Co. 259
Allis-Chalmers Mfg. Co. 277
American Audit Co. 280
American Cement Paint Co. .. 271
American Laundry Machinery Co. ..... *
American Machine Co., H. & B. 111
American Moistening Co. 109
American Scrubbing Equipment Co. 263
American Supply Co. 264
American Textile Banding Co., Inc. 144
American Water Softener Co.. 293
American Yarn & Processing Co. 280
Anchor Post Iron Works 122
Arkray Mills, Inc. 279
Arlington Cotton Mills 279
Arnold, Hoffman & Co. 254
Arrow Mills, Inc. 279
Atlanta Brush Co. 263
Atlanta Harness & Reed Mfg. Co. 140
Atlanta Rubber Stamp & Stencil Works 279
Atlanta & West Point R. R... 285
Auto Creel Corp. 262

Barber-Colman Co. 293
Barber Mfg. Co. 295
Barrett Co. ..... *
Bayley Mfg. Co. 269
Beer Co., H. & B. 281
Belger Co. ..... *
Birmingham Slag Co. ..... *
Bird-Potts Co. 278
Blake Electric Mfg. Co. ..... *
Boger & Crawford 281
Bond & Co., Chas. 134
Borne, Scrymser Co. 255
Bosson & Lane 256
Bowser & Co., S. F., Inc. 25
Bradley Mfg. Co., A. J. 152
Brandwood, John 250
Briggs-Schaffner Co. 280
Brinton Co., H. 162
Brooks & Doxey (1920) Ltd... 4
Brown Co., A. & F. 29
Buckeye Blower Co. 138
Butterworth & Sons Co., H. W. ..... 244 and 245

Callaway Mills, Inc. 281
Carlyle-Johnson Machine Co. . 274
Carrier Engineering Corp. 297
Carter Electric Co. 276
Carver-Beaver Yarn Co. 279
Central Dyestuff & Chemical Co. 144
Chicago Bridge & Iron Works 291
Chisholm-Moore Mfg. Co. 275
Ciba Co., Inc. ..... *
Classified Opportunities 282 — 283
Clements Mfg. Co. 278
Cole Mfg. Co., R. D. 297
Collins, J. D. 297
Commercial Acetylene Supply Co. 140
Cooper Hewitt Electric Co. .... *
Corn Products Refining Co. ...253
Cortright Metal Roofing Co... 295
Crane Co. 33
Cresson-Morris Co. 274
Crompton & Knowles Loom Works 12
Curtis, Paul W. 295
Curtis Pneumatic Machinery Co. 275
Cutter Works, George 10

D-A Lubricant Co. 276
Davis, Roger W. 12
Dixie Culvert & Metal Co. .. *
Dixie Portland Cement Co. .. 272
Dixie Mercerizing Co. 152
Dixon Crucible Co., Jos. 140
Dodge Sales & Eng. Co. .... *
Draper Corporation 3
Drouve Co., G. 271
Dufur & Co. 295
Du Pont de Nemours Co., E. I. 249
Durant Mfg. Co. 266

Eclipse Textile Devices 261
Economy Baler Co. 287
Electric Smelting & Aluminum Co. 256
Electro Bleaching Gas Co. 297
Emmons Loom Harness Co. 289
Ernst & Ernst 118

Fafnir Bearing Co. 6
Fawcett, Hughes 280
Federal Electric Co. ..... *
Firshing Co., J. A. 140
Flexible Steel Lacing Co. 291
Fletcher Works 247
Flint Mfg. Co. 279
Florsheim, H. A. 279
Ford Co., J. B. 256
Foundation Co., The 22
Foxboro Co. 136
Franklin Process Co. 2

Gallaudet Aircraft Corp'n.... 291
Garland Mfg. Co. 144
General Electric Co. ..... *
General Machine Works 160
Georgia Railroad 285
Georgia Railway & Power Co. *
Goulds Mfg. Co. 291
Grasselli Chemical Co. 252
Gray Mfg. Co. 279
Greist Mfg. Co. 260
Grinnell Co. 34

Hauser-Stander Tank Co. 297
Hayes Loom Reed & Harness Co. 264
Hemphill Co. 157
Hightower Box & Tank Co... 287
Hockaday Co. 271
Hotel Cecil 287
Hotel Martinique 282
Hotel Tuller 282
Hough Shade Corp. 134
Howard & Bullough Amer. Mach. Co. 111
Hunt Machine Co., Rodney.. 248
Huntington & Guerry, Inc. .. *
Hyatt Roller Bearing Co. 36

India Alkali Works 262
International Eng'g Works .. 299
Ivanhoe-Regent Works of G. E. Co. ..... * *

Jacobs Mfg. Co., E. H. 297
Jacobs & Co. 267
Jenkins Bros. 276
Johnson & Co., Oliver 24
Jordan Mfg. Co. 140
Kali Mfg. Co. 255

Keever Starch Co. 252
Keystone Fibre Co. 266
Kirby-Cogeshall Co. 152
Klauder-Weldon Dyeing Mach. Co. 248
Korite Products, Inc. 264

Lamson Oil Co. 273
Lennig & Co., Chas. 254
Lestershire Spool & Mfg. Co. 258
Lewis Co., G. B. 265
Lidseen 274
Link-Belt Co. 30
Lockwood, Greene & Co. 23
Lombard Fdry. & Mach. Wks. 293
Lord Bros. 4
Lunkenheimer Co. 13
Lupton's Sons Co., David.... 297
Lyon Metallic Mfg. Co. 136

Macomb Machine Co. 246
Manufacturing Equip. & Eng'g Co. 265
Mason, Volney W. 297
Masury-Young Co. 289
Mates-Brown Co., Inc., B. P. *
Mathieson Alkali Works, Inc. 251
Merrow Machine Co. 160
Metz Co., H. A. 130
Miles Refrigerating Co. ..... *
Mitchell-Bissell Co. ..... *
Monroe Calculating Machine Co. 120
Morehead Mfg. Co. 295
Morse Chain Co. 32
Mossberg Pressed Steel Corp.. 257
Murray Company, The 126
Myrtle Mills, Inc. 279

Nashville Industrial Corporation 283
National Aniline & Chemical Co. 1
National Paving Brick Co. .. *
National Shawmut Bank 15
Newport Chemical Works, Inc.132
New York & New Jersey Lubricant Co. 113
Norwood Engineering Co. .. 246

Oxweld Acetylene Co. 124

Palmer Co., I. E. 262
Parker Co., Walter S. 259
Parks-Cramer Co. 9
Parkdale Mills, Inc. 279
Pearson, Jos. T. 160
Phila. Drying Machinery Co.. 246
Philadelphia Felt Co. 257
Proctor & Schwartz, Inc..... 248

Re-Fil-It Broom Mfg. Co. .. 269
Reliance Machine Works.... 160
Renold, Inc., Hans 291
Rex Engineering Corp. 20
Robert & Co. 18
Roessler & Hasslacher Chemical Co. 142
Rohm & Haas Co. 254
Ross-Gould Co. 268
Roy & Son Co., B. S. ..... *
Royal Metal Mfg. Co. 152
Rundle-Spence Mfg. Co. 269

Saco-Lowell Shops 12
Sandoz Chemical Co. 243
Sanymetal Products Co. 113
Sargent's Sons Corp., C. G. ...247
Scaife & Sons, Wm. B. 287
Schaum & Uhlinger 247
Schofield's Sons Co., J. S. .. 278
Schofield Co., Wm. 291
Scott & Co., Henry L. 265
Scott & Williams, Inc. 147
Service Recorder Co. 265
Shambow Shuttle Co. 8
Showalter Printing Co., A. J. 268
Silberberg Co., Mortimer J... 264
Sirrine Co., J. E. 21
Skayef Ball Bearing Co. 5
Smith & Furbush Machine Co. 293
Smith & Bros. Typewriter Co., L. C. 268
Sonneborn Sons, Inc., L. .... *
Southern Cypress Mfg. Asso. 293
Southern Railway System.... 270
Southern Spindle & Flyer Co. *
Southern Theatre Equip. Co.. 16
Southern Wood Preserving Co. 138
Southern Yarn Co. 280
Southwestern Broom Mfg. Co. 266
Stafford Co. 7
Staley Mfg. Co., A. E. 255
Standard Fibre Co. 285
Standard Gas Products Co... 276
Steel Heddle Mfg. Co. 132
Stuhrman, Edw. A. 128
Surpass Chemical Co. 243
Suter, Alfred 262
Sydnor Pump & Well Co. 295
Taylor Co., Halsey W. 266
Taylor Instrument Co. 248
Terrell Machine Co. 118
Texas Co. 26
Texas & Pacific Railway..... 285
Textile Finishing Machinery Co. 298

Thompson & Binger, Inc. .... *
Tolhurst Machine Works 115
Toomey, Frank, Inc. 282
Torrington Co., The 158
Transmission Ball Bearing Co. 273
Trump Bros. Machine Co..... 162
Truscon Steel Co. ..... *

United Chemical Products Co. 287
Universal Winding Co. 148
U. S. Ball Bearing Co. 27
U. S. Bobbin & Shuttle Co.... *

Valley Waste Mills 300
Vermont Spool & Bobbin Co... 8
Vogel Co., Jos. A. 268

Wadsworth, Howland & Co., Inc. 243
Walke Box Co. 152
Walker Electric & Plumbing Co. 277
Walsh & Weidner Boiler Co.. 278
Want Ads 282
Ware Paint Co. 291
Warren Soap Mfg. Co. 134
Washburn & Son, L. R. 261
Weimar Bros. 279
Westinghouse Electric & Mfg. Co. ..... 10 and 11
White Co. 17
Whitin Machine Works 14
Whitinsville Spinning Ring Co. 260
Wildman Mfg. Co. 150
Williams & Sons, I. B. 31
Williams Co., J. H. 14
Wolf & Co., Jacques..... 256
Wood's Sons Co., T. B. 28
Woodward, Baldwin & Co.... 279
Woolford Wood Tank Mfg. Co., G. 293

Youngstown Sheet & Tube Co. 272

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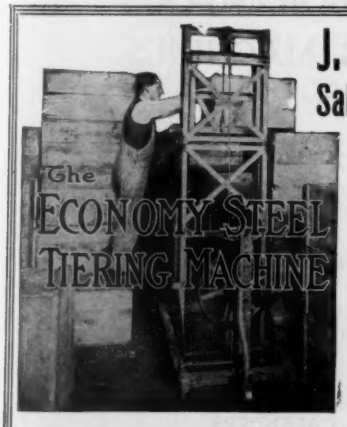

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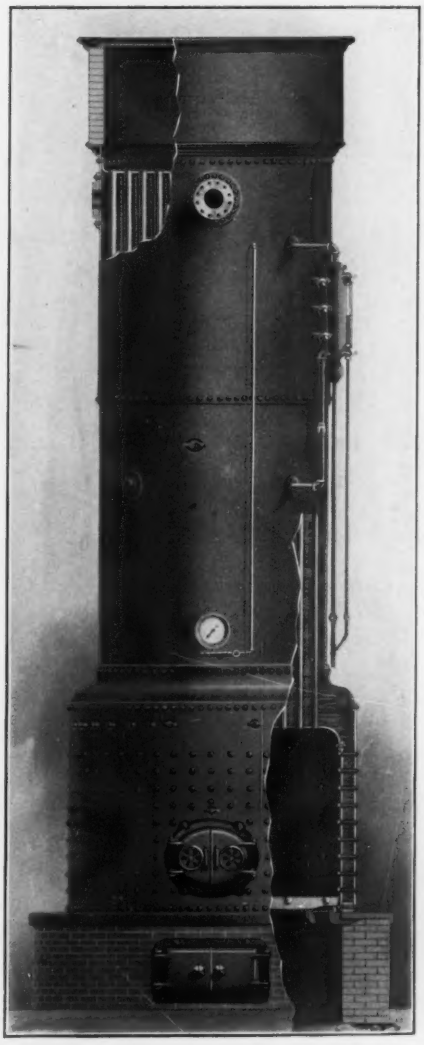

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